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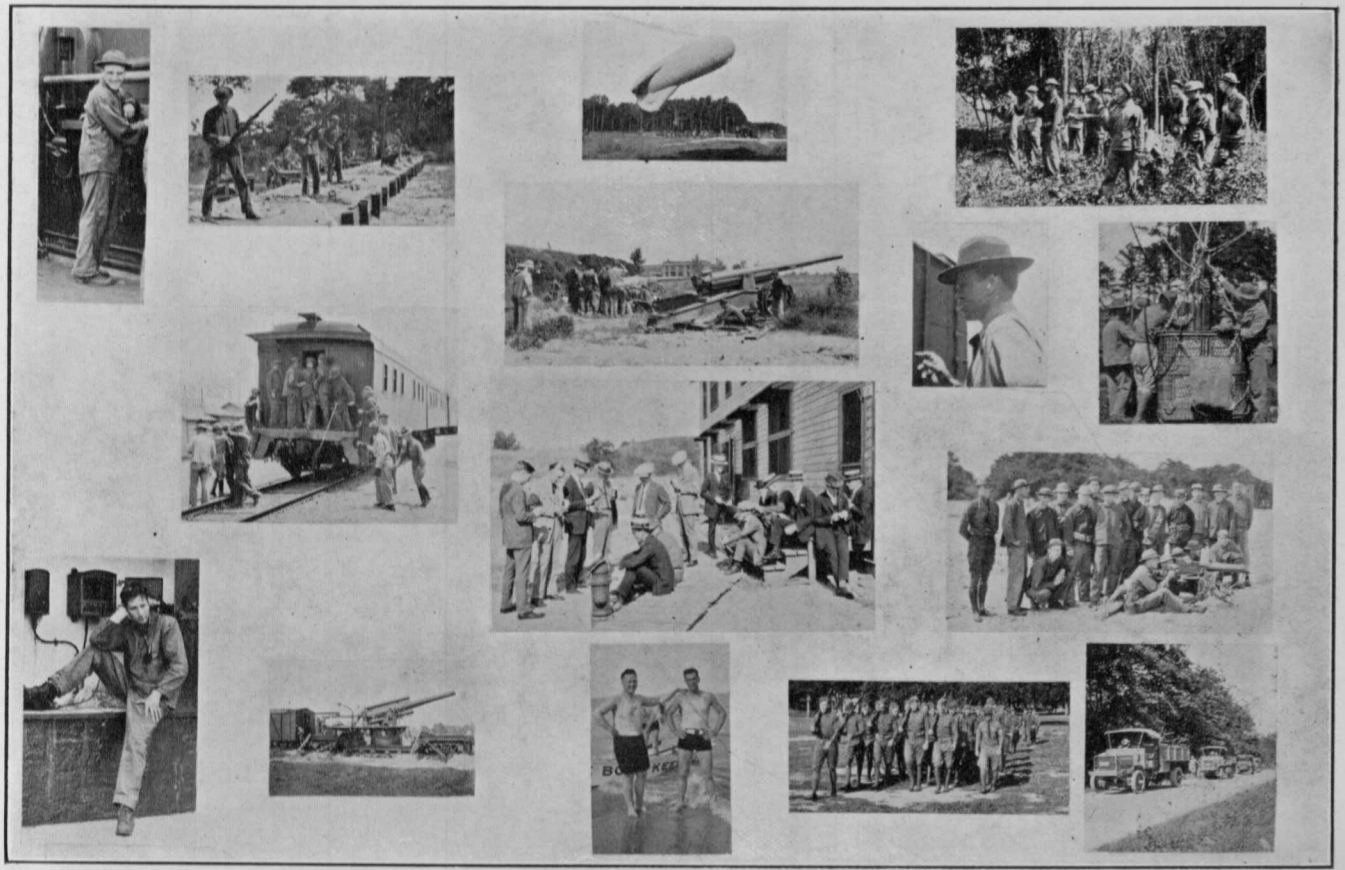

SNAPSHOTS OF THE 1922 COAST ARTILLERY R. O. T. C. CAMP AT FORT MONROE

The Coast Artillery Journal

Vol. 57 No. 2 AUGUST, 1922 Whole No. 192

Honorable Mention, Prize Essay Competition, 1921

Improved Training Methods for the Fixed Defenses

By Major Joseph C. Haw, C. A. C.

I. INTRODUCTION

THOUGH the fixed cannon may be eventually ousted by railway artillery; though the latter weapon may be rendered obsolete by aviation, and aviation in turn driven from the skies by some agency as yet undiscovered—still, you can not dodge the fact that for some years to come, the future of the Coast Artillery Corps will continue to lie in the fixed defenses. Further, since these defenses exist now, and are constantly being extended and improved, the greatest problem confronting the Corps is the development of the most efficient means of utilizing the fixed armament—in short, it is Training. Then what could more intimately affect the future progress of the Coast Artillery than "Improved Training Methods for the Fixed Defenses?"

Present training methods are sound, but like every other live human activity, they are not perfect: they may be improved. It is the purpose of the present article to suggest means of improvement. However, the writer is not a wild-eyed reformer who thinks everything has gone to pot; on the contrary, the ideas advanced here are but common-sense, logical, progressive developments, built upon the sure foundation of past experience. This discussion therefore deals with the branches of training enumerated in Coast Artillery Memorandum No. 1, 1921, the latest instruction order at the present writing (December, 1921).

So much for the general nature of the improvements to be suggested. In setting forth these ideas, the first effort will be to establish the supreme importance of training. Next, the three directions in which we

must strive for improvement are shown: the chief of these is the imperative need of infusing the thought of War into every ramification of training, and this conception will be found to dominate all that follows. Thus we arrive at the part of the article where the training methods proposed are taken up in detail; these methods are classified according to subject, as Infantry, Signalling, and so on; in this connection, it should be stated that certain forms of training, for example small arms target practice, are not discussed at all, for the reason that the author has no important improvements in mind along these lines. Then follows a plea for standardization of training (after all, there is no factor which is more essential to success than this) and a suggested means of attaining proper standardization. Finally, it is shown that in the last analysis, no training can be successful without the display of forethought, enthusiasm, and common sense by battery officers.

A. Importance of Training

When all is said and done, the most important thing in the world, to the officer on duty with troops, is the training of those troops. The JOURNAL is full of articles descriptive of the latest types of matériel, and this is as it should be; but we must not forget that the primary duty of the soldier is to make the best possible use of the weapons which he actually possesses. Again, the increasingly heavy demands of paperwork are apt to create a false sense of the importance of administrative details, to the detriment of training. It is too bad that although the most trivial papers often pass through the offices of higher commanders, the latter rarely have an opportunity to examine for themselves into the state of training of an organization, so that the very officers who have the best-trained troops may sometimes be those who are most constantly in hot water because of really minor errors in paperwork. Such circumstances are a great temptation to anybody to place the writing of correspondence and reports above the demands of training. However, the conscientious officer can not fail to realize that the proper place for him, during hours of instruction, is with the troops, and not in an office.

B. Present Conditions Call For Improvement

Although it is self-evident that training, like everything else that we do, should be conducted as efficiently as we know how, yet the present situation is such that it is well worth while to examine into the reasons which call for a revision of training methods. To begin with, the mission of the Regular Army has changed radically from former conceptions. In the "good old days" we were satisfied if the soldier who was discharged at the end of a three year enlistment was a well trained and well disciplined artilleryman. Nowadays, our man should reach the same degree of proficiency in a much shorter time, and a much higher degree of skill

in the course of three years. The first condition is essential because the Regular Army must acquire the ability to train men *quickly*, so that upon the outbreak of war we will be able to develop enormous numbers of civilians into soldiers in an extremely short time. Second, a higher degree of skill must be imparted to the enlisted personnel, not alone because the small Regular Army must be highly efficient, but equally because *every* soldier who is discharged should be capable of acting as an instructor and non-commissioned officer in case of war.

C. Battle Efficiency the Real Goal

There is another supremely important point to be considered when one undertakes to formulate means of improving training. Since efficiency in War is the ultimate goal, every step of training must be deliberately planned to promote *Battle* efficiency, and the training must be conducted by men in whose minds the thought of *Battle* is ever-present. Does our training conform to these requirements?

To answer this question, it is necessary to consider the traditions which have influenced the training of the Coast Artillery. Although the Artillery has acquitted itself gloriously in every war, yet when the separation into Coast and Field took place, for various reasons the Coast Artillery appeared to forget the splendid heritage of the past, and in building up a new science of harbor defense, target practice was made a fetish which almost drove the thought of War into the background. In the decade ending in 1917, the Figure of Merit became the final measure of a battery commander's efficiency, so that target practice naturally came to dominate the thought of the Coast Artillery. Not only that, but the conditions of conducting this practice were gradually formalized out of all resemblance to the methods which would be necessary in an actual engagement. A few examples will serve to illustrate the state of mind produced by these conditions. During the period of which we are speaking, the officer who had just entered the service heard a vast deal of talk about target practice, but very little about war; and although enlisted men were very carefully instructed how to meet all the contingencies which might arise in target practice, not often did they hear the word "Battle" from the lips of an officer. There developed also a notable neglect of Coast Artillery tactics; in the early part of his service, the writer was taught only one important tactical principle (but upon this particular point all experienced battery commanders seemed thoroughly agreed) and this principle was as follows: that upon the first shot being fired in an engagement, every self-respecting battery commander would immediately cut the wire which connected him to the Fire Commander's station—it seemed that any other course would be in direct violation of all Coast Artillery usage. A more striking evidence of the lack of interest in tactics is the fact that the pamphlet entitled "Tactical Employment of Heavy Artillery (Provisional)," pub-

lished by the Coast Artillery School in the year 1921—note the date—was, as far as known, the *first* serious attempt at an official publication dealing exclusively with heavy artillery tactics.

What bearing, you ask, does all this have upon present conditions? Simply this: that since none of our fixed coast defenses participated in an action in the recent war, there is a very real danger that these conditions may persist, so that the idea of *battle efficiency* as the goal will not dominate the thought of the Coast Artillery as it should. In fact, not only is there a possibility that these conditions *may exist*—there is reason to believe that they *do* exist right now, at least in so far as the widespread lack of interest in tactics is concerned. The reception accorded the pioneer pamphlet referred to above ["Tactical Employment of Heavy Artillery (Provisional)"] is in itself sufficient proof that the officers of our Corps are but slightly interested in tactics; for there has been hardly a word, either of criticism or commendation, spoken or written about this book, despite the fact that it is undeniably an epoch-making work for the Coast Artillery. If any further evidence were necessary, we have but to scan the table of contents of the JOURNAL from many years back up to the present date, to see that articles on tactical subjects are almost as rare as the Dodo; and I am reliably informed that the present Editor has met with little but discouragement in repeated efforts to induce officers to write upon tactical matters. The evil results of this state of affairs are two-fold. First, we lose a tremendous opportunity for arousing the interest and enthusiasm of men and officers alike; all men, especially young men, love to play at war, and the officer who can dramatize his instruction enough to make his subordinates enter into the spirit of the game will not be seriously troubled by indifference and inattention. Second, and more important by far, the doctrines evolved and the training conducted can not possibly be as sound as if the idea of battle were dominant.

Therefore the idea of battle must be manifested in training as often and in as great a variety of ways as possible. It is not proposed that the soldiers shall be fed on raw beef, nor even that they should be dragged from their beds at midnight to hurl back an imaginary onslaught; but there really are many eminently sane ways in which we can simulate action and drive home the realization that the Coast Artillery is a *fighting* branch. Methods of doing this will be brought out to some extent in the following pages, but for the sake of clearness and emphasis a few general observations will be entered here. First, in all forms of drill, tactical situations should be frequently assumed (sub-caliber practice affords unusual opportunities for this), and whenever this is done, all officers and men should be fully informed of the conditions which are supposed to exist, and the object of the problem. Even in athletics, runners may be given a message to carry, and in signalling, data may be sent from base-end stations or information from advanced observation

points. In Infantry and artillery drills of all kinds, casualties should be assumed often, and the work carried on with reduced personnel. Senior non-commissioned officers, who may be called upon to command the battery in the event of the officers becoming casualties, should understand more than the mere giving of commands—they should be grounded in the tactical employment of their weapons. Injuries to matériel should also be supposed to occur. All emergency stations should be manned frequently, and utilized for drill and sub-caliber firing. Although mentioned last, no step would exert a more profound influence upon all forms of training than would a transformation of service practice into a more faithful simulation of battle.

D. Three Cardinal Lines of Improvement

Considering the facts brought up to this point, it is clear that in this, or any other effort to advance suggestions for the improvement of training, there are three basic aims which must govern the discussion. First, the same training which has been given in the past must be accomplished with equal thoroughness in a much shorter period. Second, the time thus saved must be devoted to more advanced training. Third, and most important of all, the thought of *war* must color every detail of instruction, adding life and interest to the dullest points and making each act of training, no matter how minor, a definite step in the progress of the command toward the ultimate goal—efficiency in *war*.

The suggestions which follow are designed to accomplish these aims more efficiently than the training methods usually employed heretofore.

II. INFANTRY TRAINING

The scope of this instruction is prescribed in paragraph 1c, Coast Artillery Memorandum No. 1, 1921, which reads as follows:

"*Infantry Instruction.* This instruction will be limited to that necessary for disciplinary training, to insure proficiency in ceremonies, and the proper performance of riot duty. It will also include small-arms and machine gun practice, and problems involving the local protection of the batteries."

In order to develop efficiency in "The proper performance of riot duty," something more than training in close order drill is required. In the first place, every soldier should be taught the extent of the authority which will be vested in him when he is upon this duty, especially with regard to the amount of force he can lawfully exert against the persons of rioters and with regard to the matter of entry and search of private premises. This instruction can be given better during the indoor period. In the second place, thorough instruction should be imparted in the tactical principles applicable to the handling of mobs. Obviously, the proper way to teach such tactical principles is by means

of practical problems during the outdoor season. By detailing men to represent the mob, by assuming different situations, and by including machine guns in the equipment of the force representing the troops, this form of instruction may be rendered very interesting and varied.

Although riot duty is extremely distasteful, it calls for the exercise of skill and tact of a high order, and blunders may result in destruction of property, and in bloodshed, therefore officers should exert themselves to prepare their commands for its efficient discharge.

"Problems involving the local protection of the batteries" should include elementary training in scouting and patrolling; here the non-commissioned officers will be called upon to practice the art of map reading, in which they should have been previously instructed. Signalling will also find a practical application. Moreover, these problems afford a splendid opportunity for instruction in the choice of positions for machine guns, their emplacement, and their tactical use. Blank ammunition will do much to arouse and sustain the interest of the men and will considerably enhance the practical character of the instruction.

With the objective in infantry training stated as it is today, it should no longer be necessary to expend an entire month of the outdoor season upon this instruction alone, as was often done when the Coast Artillery was regarded as "red-legged infantry." The infantry education of the troops ought to be accomplished concurrently with artillery work, an entire morning being occasionally devoted to an infantry problem. Infantry practice marches of a week or more are highly desirable if time permits, but should not take precedence over artillery marches. (See "Mobile artillery," below.)

A. Machine Guns

Instruction in the use of this weapon is specifically enjoined by the current instruction order (see paragraph quoted above). Nomenclature, care and adjustment, and operation should be taught during the indoor season only, in order that all the time given to machine guns during the outdoor season may be spent in actual firing and instruction in the tactical use of the machine gun in infantry problems.

III. CAMOUFLAGE

Notwithstanding the fact that this branch of the military art is barely mentioned in C. A. M. No. 1, 1921, it certainly deserves the most serious attention from Coast Artillerymen. The high visibility of our open concrete emplacements, to the aviator, is self-evident. Since any fleet which is powerful enough to attack our coast fortifications will unquestionably possess strong air units, we may be sure that the fleet aviation will observe the effect of naval fire and, if possible, conduct bombing expeditions against the forts. The necessity of eliminating features which may provide aiming points for naval gunners is also

obvious. It follows that we should study and experiment with methods of camouflage against observation from the sea, land, and air, and educate our men in camouflage discipline. This training should be extended to cover infantry and artillery marches and camps, and problems involving the local defense of batteries, as well as the concealment of the fixed defenses.

One of the most important branches of camouflage, for which we should train and plan, is the use of dummy batteries, and stations. The value of such devices to draw hostile fire away from the real positions was clearly demonstrated at the Dardanelles, during the World War. On page 218 of the book "Ambassador Morgenthau's Story," the author tells of seeing a Turkish dummy gun which attracted more than 500 shells from the Allied fleet.

IV. ATHLETICS

The various books on athletics which are issued by the War Department are so good that the unit commander should have no difficulty in this form of instruction.

However, it is desired to pause here long enough to focus attention upon three games which are not so widely known in the Coast Artillery as they should be. These games are: indoor baseball (played either outdoors or indoors), volley ball, and soccer. They all possess certain similar features which make them very convenient and desirable for military organizations. The principal features are as follows: None of them requires a field of absolutely fixed dimensions—each may be played on plots of varying size. They are all very easily learned. The equipment which must be purchased is very simple and inexpensive; indoor baseball requires only balls and bats, volley ball only a net and a ball, and soccer only a ball. Although well adapted for use in athletic instruction, these games are primarily useful because of their appeal to the men in leisure hours. However, the most noteworthy points are that, being relatively new games, all the players start on nearly the same plane; and that each may be played by almost any number of players at one time. Consequently, the awkward and timid men, as well as the ordinary run of soldiers—in short, all those who are not able to make the company teams in other sports—find in these games an opportunity for athletic activity which they would otherwise miss. Though the physical benefits are great, the development of iniative and self-reliance in the players is perhaps of even greater moment.

V. FIRST AID

The indoor period is pre-eminently the time for this instruction. The post surgeon should be required to supervise it and qualified men of

the Medical Department should be used as instructors and demonstrators to the greatest possible extent.

During the outdoor season, the men should be kept in practice by short periods of instruction occurring once a week or once every two weeks. In addition to this, interest may be aroused, and sustained, and the necessity for a knowledge of first aid may be impressed upon the soldiers, by requiring them to demonstrate their skill at unexpected moments. For example, at artillery drill the instructor may suddenly announce that a fragment of enemy shell has severed Private Jones' arm; the gun commander may then be required to designate men to attend the injured soldier. Similar tests may be conducted at infantry and athletic instruction. In addition to the actual application of first aid, a most important feature is that the men should be taught how many persons may be permitted to take care of the wounded while the remainder continue the battle.

VI. SIGNALLING

Everybody knows that it is extremely easy to forget the signal codes unless they are practiced continually, and yet year after year the soldiers are taught these codes and then allowed to neglect them. Why teach the subject at all if the hours spent on it are to be wasted in this way?

Fortunately, it is easy to avoid this waste. The indoor season should be utilized to impart the basic instruction in signalling. Then, once most of the men have learned the codes, they may be kept in practice all year at the expense of only a few minutes a week. This may be done by practicing the company as a unit, on two or three days a week, when it is lined up for some other formation. All that is necessary is that a message or two should be sent and received, the men in unison going through the motions of the semaphore or wigwag code, and repeating the letters aloud. All messages sent and received should be of a military nature, to further the idea of preparation for battle.

VII. ARTILLERY TRAINING

A. Attendance

It should be the constant endeavor of all concerned to make attendance at artillery instruction as nearly as possible equal to 100 per cent of the strength of all line organizations. Such a statement may appear so obvious as to be unnecessary, but everyone knows that it requires a constant fight to observe it, and that only strict and ruthless action by post commanders can prevent a horde of special duty men from evading artillery drill. Many commanding officers require even prisoners and kitchen police to attend for an hour at least, and this seems only logical.

B. Mobile Artillery Assigned to Organizations Manning Fixed Batteries*

Paragraph 1a, C. A. M. No. 1, 1921, reads as follows:

"*Service of the armament to which assigned.* This instruction will include drill, tactical problems, field exercises, firing problems, and periods of operating under war conditions."

The above paragraph obviously applies to the mobile armament assigned to units which also man fixed batteries, just as surely as it primarily applies to the fixed batteries. Although it would be unreasonable to expect the same efficiency with these guns as with the fixed artillery, it cannot be doubted that these supplementary weapons are to be taken much more seriously than was the case before 1917, when the usual idea was to expend the ammunition allowance as rapidly as possible and be done with it. One of the principal reasons for attaching greater importance to this artillery was clearly demonstrated by the World War, which but established more firmly what all of our preceding wars had shown, namely, that very large portions of the Coast Artillery will invariably serve in the field armies in time of hostilities, and in a war of any magnitude, most of this personnel will serve as *artillerymen.* An equal weighty reason for developing efficiency is evident in the fact that these guns are very useful to supplement the secondary armament in the defense of mine fields and landing places, while if the fixed secondary batteries are put out of action, this wheeled matériel is the only thing left to take their place.† Released from the need of spending an excessive amount of time on infantry work, our troops should have little difficulty in reaching a creditable state of proficiency in the service of whatever mobile guns may be provided.

Instruction in the care, preservation, and mechanical operation of such mobile pieces should be conducted during the indoor season. If it is possible to obtain a heated shelter, standing gun drill may also be taught during the winter.

At least a month of the outdoor season should be given up to "drill," tactical problems, field exercises, firing problems, and periods of operating under war conditions" with this matériel, to the exclusion of all other work. This is by no means an excessive amount of time for the purpose, and we can easily afford to spare it from the service of the fixed batteries: remember that before the World War, the training schedule called, not alone for this, but for another month for infantry work alone; and since the service of the fixed batteries was about as efficient then as it is now, we can certainly spare a month on this mobile artillery, even if it is necessary to forego a certain amount of the infantry work.

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*This heading includes mobile anti-aircraft guns so assigned.

†It is well known that mobile batteries played an important part in the defense of the Dardannelles.

When the troops are competent in drill, a practice march of at least a week's duration should be undertaken. Although there may not be sufficient transportation available to move an entire battery, almost every post can muster enough to take out two pieces at a time; if there is more than one company at a post, they may go out singly. It is certainly apparent that Coast Artillery troops should have at least a week a year of marching and camping, and it is equally apparent that no effort should be spared to have this work take the form of artillery instruction rather than infantry marches or maneuvers. If possible, target practice with the mobile artillery should be held while on this march, both map firing and direct fire being carried on. It is most essential that the pieces should be emplaced at least once, even if no firing can be managed. The occupation of a position must simulate War conditions in every respect, especially with regard to camouflage and camouflage discipline. Both on the march and in camp, the presence of hostile airplanes should be assumed frequently, and the camps, as well as the battery positions, ought to be camouflaged, and camouflage discipline maintained therein. The commanding officer may seek the co-operation of the air service in this work, as well as for observation of fire. The march will also furnish a splendid opportunity for educating the troops in traffic regulations, as well as march discipline.

If lack of transportation renders it utterly impossible to move the mobile pieces off the post, they should be put into position, and fired, on the reservation, with the same attention to detail—especially to camouflage—as if on a practice march.

The targets for practice with the mobile artillery should be both fixed and moving. The fixed targets should be located on land if possible, because in war floating targets are rarely stationary. Practice with moving targets is obviously necessary if we are to prepare ourselves to use the mobile armament to supplement the fixed secondary batteries.

C. Gunners' Instruction

The usual method of conducting gunner's instruction results in a great waste of valuable time. Most officers will admit the truth of this assertion. In the first place, the time allotted—the entire indoor season—is greatly in excess of what is actually necessary. A very striking illustration of this fact occurred some years ago, when a recruit with only an eighth grade education, coached by the company commander in person, passed the examination for second class gunner within two weeks after joining the company. Although this is admittedly an unusual case, it shows what may be accomplished by an intelligent soldier, provided he receives proper instruction. Ordinarily, however, since none of the men are examined until the examining board is convened in the spring, there is no incentive for any soldier to speed up his work, and so the brighter and more ambitious men are held down to the slow

pace of the dullards. The result is that the more intelligent fritter away most of their time, while the less talented receive but very little more individual instruction than do their abler comrades.

What is the remedy? Obviously, it is to examine the candidates as soon as practicable after their company commanders pronounce them ready. This means that the examining board would have to sit at intervals throughout the period during which gunner's instruction is given. The convening of the boards is governed by paragraph 806 of the Coast Artillery Drill Regulations. This paragraph contains the following sentence, among others: "Boards of examination will be convened in each coast defense command by the coast defense commander, to meet, if practicable, just prior to, or just after the close of the indoor instruction period." It would seem that this allows of the board meeting at intervals during the indoor period, since the intention is evidently to allow the coast defense commander a reasonable amount of latitude as to the time of meeting. The plan would perhaps place a slightly heavier burden on the board, but this would continue only during the slack season of the year. It would not be necessary to examine each candidate the very moment he is reported able to take the examination; instead, the board might meet at stated intervals after the beginning of the instruction period, or else whenever a specified number of candidates was ready.

If the scheme is to succeed, it will be necessary to provide an incentive for hard work. This can be easily handled by local commanders, as the best method of appeal will often depend on local conditions; for example, at an isolated post the granting of furloughs would stimulate the men to considerable efforts. In any case, the rewards should be graded to correspond to the efforts involved; to recur to the use of furloughs as an illustration, the schedule of awards might promise three weeks furlough for qualification within a month, a fortnight's furlough for qualification in six weeks, ten days for passing the test within two months, and so on.

This scheme of prompt examination has many advantages. In the first place, it would naturally hasten the date of qualification of all men undergoing instruction, simply because their examination would be taken in hand without delay. In the second place, by eliminating the brighter men early in the season, the ratio of students to instructors would be reduced in the case of those who were not so quick, so that they would receive a great deal more individual attention. In this connection, one naturally thinks of another step which would be beneficial in several ways, and that is to make instructors of the men who qualify, just as soon after their qualification as possible. This will cut down the ratio of students to instructors very rapidly indeed, until soon there would be an instructor for every student. The advantages to the duller men are obvious; but there is more than this to commend the idea:

the newly fledged instructors will be equally benefitted. The process of teaching others will require them to learn many minor points they would otherwise miss, besides hammering home the fundamental principles until they were indelibly imprinted on their minds. Futhermore, the government will be benefitted by the production of a large number of men who have had some experience in acting as instructors; this feature should help develop material for non-commissioned officers in the regular army, but above all, it is another step toward making every enlisted man better fitted to aid in the training of a civilian army in war time.

The two general principles of prompt examination and the use of all qualified men as instructors should be useful if adapted to other forms of training as well as to gunner's instruction.

D. THE COAST ARTILLERY WAR GAME

It is desired to emphasize the importance of this phase of artillery training because it seems to have been neglected of late. In the first place, the war game is the best means of teaching the tactical use of the fixed armament. Secondly, at posts where men of war rarely visit, the balopticon slides and ship models provide the only method of practical instruction in identifying such vessels. Third, the board and ship models may be utilized for training in observation and adjustment of fire.* In general, the game serves to focus attention upon the fact that there really is such a thing as war, and that "Home ram" has a purpose superior even to target practice; and as a corollary, it forces upon the officer presonnel an appreciation of the necessity for a tactical chain of command above the battery, and makes the officers realize the value of a uniform tactical doctrine.

It is not only possible, but fairly easy, to make most parts of the instruction very interesting. By judicious departures from the regularly accepted method of play, the game may be speeded up considerably without losing any of its value for ordinary purposes; for example, the laborious and time-consuming processes involved in the determination of hits may be dispensed with if the umpire be invested with the arbitrary right to decide when a ship is disabled or sunk. A little imagination will produce situations and methods which can not fail to interest the participants.

There are some officers who do not think the War Game is of much value. It is believed that the lack of uniformity of doctrine, the diversified wording of commands, the confusion, and the tactical errors, all of which are likely to be displayed at an average session, of the game, will convince the most obstinate sceptic, if he will only watch a game, that the use of the war game should be extended rather than restricted.

*See *The Use of the War Game Equipment for Practice in Fire Adjustment*, in the JOURNAL for July, 1921.

E. SERVICE PRACTICE

"8. Target practice should not be regarded as a test to determine the state of training and general efficiency of an organization. It is merely one of the means to be used in perfecting the training." (Extract from par. 8, page 3, C. A. M. No. 2, 1921.)

Here is at least one ray of sunlight to relieve the gloom of that depressing document known as C. A. M. No. 2, 1921. However, the purpose in dragging it forth and planting it here was more than a mere effort to show that every cloud has a silver lining. This paragraph is but a confirmation of the policy laid down in C. A. M. No. 1, 1921, and is conclusive proof of the fact that the Coast Artillery has parted forever with the harmful policy which formerly made target practice an end rather than a means. The Corps has reason to be highly gratified at seeing target practice put in its proper place after so many years.

But old traditions die hard. The actual conduct of the practice remains somewhat of a bugbear to the man who fires it. Instead of looking forward to service practice with the keen anticipation of a man about to test the machine upon whose development he has spent months of effort, officers are still prone to regard it with aversion, as a time of trial and tribulation; and above all, as the occasion for the preparation of target practice reports—papers which, like bread cast upon the waters, may return after many days.

What are the causes which make the popping of a few pounds of powder such a dread event? The merest shavetail knows the answer: our failure to cast aside the traditions which, in the "good old days," made service practice a solemn, and mystic rite. The puzzling complexity of the existing target practice ritual is illustrated by the fact that the latest *Target Practice Reminder List* is more than double the size of its predecessor, that for 1917; the chief bearer of the ritualistic burden is naturally the battery commander, so in the 1921 *Reminder List* it is not surprising that there are no less than eight full pages of instructions and advice for this functionary alone. He, poor devil, is required to submit a grand total of six separate reports. (Now we are beginning to hit bottom in our search for the factors which serve to render service practice almost as unpopular as kitchen police.) Consider for a moment what becomes of these reports: most of them pass through several higher commanders and eventually reach the office of the Chief of Coast Artillery; and each intermediate commander has his staff actively employed in a whole hearted effort to pick out every error, no matter how trivial. There is nothing against this: it is quite right and proper. However, it does furnish the explanation of the reason for the battery commander's apprehension concerning the preparation of target practice reports. But stay: on second thought, one may well

ask, why be apprehensive about it after all? Is it not an easy matter to avoid mistakes in the preparation of these reports?

The best way to settle this question is to discover whether or not battery commanders are actually blundering in this matter. Fortunately, we have not far to look for an authoritative statement on the subject. C. A. M. No. 2, 1921, is a critical discussion of the errors made during the target practice season of 1920. It is a mimeographed pamphlet of 103 legal cap pages, therefore from the bulk alone anybody naturally would jump to the conclusion that there were an appalling number of errors made during the year 1920; and this view is substantially confirmed by a careful reading. The mistakes listed cover an almost inconceivably wide range, and only a portion are mistakes in the preparation of target practice reports; but the latter class of faults are sufficiently numerous to justify the conclusion that an unwarranted number were made. Still, we must certainly credit our battery commanders with average intelligence. Then why should they have made so many mistakes? Why should it be so easy for them to err? It begins to appear that there may be something wrong with the system. *Would there not be fewer mistakes if the system of reports were simplified?*

Suppose the battery commander were given a sporting chance. It is true that present conditions are the result of gradual growth, but certainly the time is ripe for improvement. First off, then, suppose that a beginning could be made by consolidating these six miscellaneous reports into a single one, for which a blank form would be provided. Such a form should have captions so clear and full that no one could possibly fail to understand their meaning, and should carry copious notes which would explain ***in full*** the exact method of obtaining each item of data required. Moreover, although this is not the place to go too much into detail, the pious conviction may be expressed that, instead of being a rather skimpy affair like Form 819, each blank column and space should be roomy enough so that the bulkiest entries might be made on the typewriter; that there should be spaces for a large number of shots; and that, where notes or descriptions are required (as in the case of descriptions of new apparatus or methods) several entire blank sheets should be provided. Evidently, such a form would require several pages, and be a bit bulky; but what a relief to have everything in one place, with printed instructions so full and clear that it would be impossible to make a mistake!

So much for the layout of the form. An equally important question remains: what data shall this form be planned to present? Shall it provide for setting forth exactly the same information which is entered

*These reports are: Form 819; Report of Critique; Analysis of Practice; List of Officers on Duty with Battery during Firing; List of Officers attending Critique—all the foregoing are required by par. 17, C.A.M. No. 1, 1921; the sixth report is the Report of Inspection of Matériel after Practice, required by par.239, C.A.D.R.

in the six miscellaneous reports now prescribed? These questions can not be answered here; but it seems reasonable to suggest that they should receive due consideration, and it is quite possible that a thorough study of the subject might lead to the belief that some changes would be desirable. It is not out of place to note some of the points which should be considered if such a study were made. In the old days, one of the primary purposes of target practice reports was to provide ballistic data; but the capabilities, limitations, and peculiarities of our weapons are now thoroughly understood, so that this consideration is no longer of so much importance. To day, the Coast Artillery is not testing weapons: instead, it is training men. Therefore, the report of target practice, after is is filled out by the battery commander, need present only such information as will directly advance artillery training. Moreover, for obvious reasons, the steps necessary to secure the basic data, and the manipulation of the basic data to produce the finished report, should be as simple and easy as possible, and all data and mathematical operations should be rigidly excluded unless they contribute directly to the compilation of information which is unmistakably calculated to increase the efficiency of training. Evidently, information "calculated to increase the efficiency of training" must be concerned with one of the following subjects: (1) the determination of errors of personnel or of armament; (2) the measurement of the relative efficiency of various methods of observation and adjustment of fire; (3) the establishment of tactical principles.

There is another point to be given due weight in any study of target practice reports. Since guns are not instruments of precision, it is a waste of energy to attempt too great refinement in these reports. For example, par. 8, pages 6 and 7, C. A. M. No. 2, 1921, indicates that the course of the tug should be tracked separately, in addition to the course pursued by the target; surely, for all practical purposes, it would be sufficiently accurate to plot only one course, the track of the target. Moreover, too great refinements are liable to demand the introduction of methods of securing data which are highly artificial and opposed to what would be done in battle.

We now turn to another phase of target practice. There has been some complaint that fire commanders and their superiors are prone to nag and harass the battery commander during training and target practice. Of course, it would be an absurd and unwarranted reflection upon the entire Corps to charge that this attitude is true of our field officers in general; it certainly is not. However, it can not be denied that there is a very general tendency to demand the battery commander shall make higher commanders acquainted with the most detailed steps of his target practice preparations, and not only this, but a tendency for fire commanders to keep too close a control over the execution of such details. It is believed that this tendency will persist just so long as

the target practice ritual continues to present as many pitfalls as the Income Tax return. We are back at the same old story. As long as it is so exceedingly easy for the battery commander to make mistakes, it is only human nature that the next superior, who will smart for the errors of his junior, should feel it necessary to have his finger in the pie as a matter of self-protection. But smash the tradition of complex target practice reports, and with the same blow you will lift the pall of apprehension which sometimes causes interference by superiors. Show the fire commanders and others that it can be done with safety to themselves, and they will drop their too close control of minor details as fast as they can.

So far, we have dealt almost exclusively with the reports of target practice. But the term "target practice ritual" has been used frequently, and under this term, the writer includes not only target practice reports, but all the details of securing data, counting hits, safety regulations, and so on. Now the reader is well aware that the majority of the points in the target practice ritual are concerned with the securing of data, and similar matter, all of which are dependent upon the nature of the information which is needed to fill out properly the regular reports of practice. Therefore, it is as plain as the nose on your face that any revision in the report will have a far greater effect than would appear at first blush; in fact, it would result in a more or less important change in the ritual and technique of target practice. Summing up, then, it is contended that if the battery commander is given a simple, practical, foolproof report, he will soon begin to look forward to target practice as the greatest sporting event of the year, and so will the fire commander; and if you can once make them feel that way about it, there will soon be a radical alteration in the attitude of the whole Corps toward service firing.

But before leaving the subject entirely, there is one more point—the most important one too—to be considered. Since service practice is inherently more closely akin to battle than is any other form of training, every possible means of heightening the relationship should be sought. It is inevitable that certain conditions differing from those which will exist in battle must be permitted in target practice if any good is to result, for example, the conditions necessary for the collection of data; but these artificial matters should be cut to the absolute minimum, while on the other hand, if it is possible to introduce any features which will heighten the resemblance of service practice to action, no pains should be spared to include them. There are undoubtedly great possibilities, as yet undeveloped, for making service practice represent more nearly the situations of battle.

VIII. Standardization of Training

In order to secure the maximum efficiency of the Coast Artillery

as a whole, training should be standardized. Unless some universal standard of efficiency is adopted, each unit will be developed according to the bias of its commanding officer, so that although some will excel in one department and others in another, yet almost every one will be below average in one or more particulars. These facts are so obvious that to dwell on them longer would be a waste of time.

However, there may be some who consider that our training is already standardized. Now it is granted that "Home ram" is executed in the same identical manner at all Coast Artillery posts; but when we dig deeper, differences begin to appear. It is not necessary to try to prove this, nor to bring out the nature of the differences, for there is a very simple test which the reader can apply himself if he is skeptical. Such persons are invited to draw up their own "Minimum specifications," (these are discussed below), and to apply these specifications, in their mind's eye, to any post with which they may be familiar. There is, however, an even simpler and easier means of testing the uniformity of training which prevails: the most hurried reading of Coast Artillery Memorandum No. 2, 1921, will show that during the target practice season covered by that document, the variations in the different commands were truly startling. It may be taken as a fact, then, that the need for standardization does actually exist.

Such being the case, it becomes advisable to consider the manner in which this need may be satisfied. Now the best way to standardize is not to lay down rigid rules for methods of training, but to provide a suitable gauge by which results may be measured. Although C. A. M. No. 1, 1921, lays down the subjects in which instruction is to be given, it does not specifically fix the degree of proficiency to be attained. How, then, may a proper gauge be constructed?

This question, as far as the training of individuals is concerned, has been answered by the War Department with the "Minimum Specifications" for soldiers. These specifications set forth the minimum requirements that a soldier should be expected to meet, each grade and office, from private up, having its own particular requirements plainly stated.

We could hardly do better than to adapt this "Minimum Specification" idea to our purpose by drawing up specifications intended to fix the minimum degree of training to be attained by every organization. Every unit commander would then know exactly what results would be demanded of him; and further, in addition to having the objective thus definitely presented to the battery commander, there is the other advantage of being able to determine the proficiency of any organization very easily at any time. Finally, this plan would not in any way hamper the initiative of the battery commander as to the means he might choose to employ in reaching a satisfactory state of training with his unit.

Although the greatest value of this idea lies in its capabilities for

standardizing training, it is important to note that it is also a very useful thing to the battery commander even though it is not prescribed by orders. To conduct the training of his battery efficiently, the battery commander must have some connected, progressive plan, and to construct such a plan he must have his objective clearly stated: this he may accomplish best by drawing up a set of minimum specifications of his own.

Let us set down a rough outline of such a set of specifications, in order to get a clear idea of how the project would shape up. For present purposes, it is sufficient to make our requirements very general in nature. It must be thoroughly understood that the set of minimum specifications which follows is a mere sketchy outline.

In this set, whenever it is stated that all the members of a unit must be proficient in a certain thing, the phrase is to be interpreted as applicable only to those soldiers who have completed a full period of training in the subject under discussion, as recruits are liable to join at any time of year.

However, it is to be remarked that whatever gauge is adopted should be of such a nature as to be applicable at any season of the year, since its purpose is to develop Battle efficiency, and War has no set visiting day. For example, although every man may have qualified in signalling in the spring, yet if half of them have forgotten the codes by December the training in that subject has not been up to the minimum specifications. On the other hand, the accepted standard must be applied with discretion and common sense; if the garrison of a northern post is turned out for Artillery drill in January, the personnel should be capable of drilling satisfactorily, but it would be unreasonable to expect the smoothness and finish which would be demanded in August.

A. Sketch of Minimum Specifications For Training of Units Manning Fixed Batteries

Infantry Training

1. Each unit shall be proficient in close order drill, in such ceremonies as may be prescribed, in guard duty, and in the manual of the bayonet.

2. A fixed percentage of the men shall be qualified in small arms practice. (The writer has not sufficient data at hand to suggest definite figures.)

3. Every man shall understand the basic legal rights of a soldier on riot duty in regard to the amount of force he may exert and the matter of entry and search of private property. The unit shall be able to demonstrate its proficiency in the tactics of riot duty by the satisfactory solution of an assigned problem in which the mob is represented or outlined; machine guns shall be used in this problem.

4. The unit shall be able to solve successfully an assigned problem in the local protection of the batteries, including elementary scouting and patrolling and the use of machine guns.

5. The unit shall be proficient in the care, preservation, operation, and emplacement of machine guns, and must make average scores, or better, in machine gun practice.

Camouflage

1. The organization shall be prepared to make the best use of whatever camouflage materials may be available, and every man must be thoroughly familiar with the requirements of camouflage discipline. (All these specifications refer to the concealment of fixed and mobile batteries, and camps.)

Athletics

1. The unit shall be proficient in the particular group of setting-up, or other exercises which may be prescribed.

2. Every man shall be an average player, or better, in at least one recognized sport.

3. Every man shall be physically fit at all times, unless suffering from disease.

First Aid

1. Each man shall be capable of passing the usual examination in this subject. (Scope and character of examination should also be stated here.)

Signalling

1. Each soldier shall be qualified in the wigwag and semaphore codes. (Rates of sending and receiving should also be stated here.)

2. The signal detail shall be proficient in the use of all additional means of signalling for which equipment is provided on the post.

Artillery Training

Mobile Artillery

The unit shall be proficient in the following:

1. The service of the piece.
2. Marching and camping.
3. Establishment of battery in position, including establishment of observation posts and communications.
4. The solution of problems in direct fire upon both fixed and moving targets, and in map firing upon fixed targets.

Gunner's Instruction

1. Each man who has been through one course of instruction shall be a second class gunner, and each one who has passed through two terms shall be a first class gunner. The only exceptions permitted shall be men whose mentality is below average, in the opinion of the post surgeon.

War Game

1. Soldiers shall be proficient in identification of warships, and generally familiar with the water areas, datum points, and so on.

2. Senior sergeants shall be able to work out simple problems, in which they act as battery commanders, without flagrantly violating any important tactical principles.

3. Each officer shall be able to demonstrate that he possesses a satisfactory understanding of the tactical principles governing the employment of Coast Defense weapons.

Service Practice

1. The service practices of the organization shall be so conducted as to satisfy the Coast Defense Commander that the "Objects of Practice" enumerated in par. 11, C. A. M. No. 1, 1921, have been satisfactorily accomplished.

General

1. The unit shall be proficient in the service of the piece with the fixed guns.

2. At all times (not only at formal inspections) the condition of all emplacements, magazines, stations, instruments, communications, guns, and other matériel, shall be such as to justify the conclusion that the unit is proficient in the care and preservation of matériel.

3. Each fixed battery shall have at least two emergency stations for every regular station, and the personnel shall be proficient in occupying these stations promptly and in using them in drill.

4. Each battery shall be equipped with a satisfactory system for observation of fire, and be thoroughly proficient in its use.

5. All officers and senior sergeants shall be capable of adjusting the fire of the battery upon a target. (This does not imply that nobody except one of these individuals may normally adjust the fire, but simply that each of them shall be capable of adjusting it.)

6. With the personnel at varying strengths, from full strength down to the lowest which will permit of operating at all, it must function with reasonable efficiency, considering the circumstances in each case.

7. Every officer and non-commissioned officer shall not only be proficient himself in all of his duties, but shall be also a capable instructor and leader.

8. At all times, there must be a competent understudy provided for every position at the battery and in the company organization. In the case of officers and non-commissioned officers, each shall be capable of performing efficiently the duties of the next higher grade.

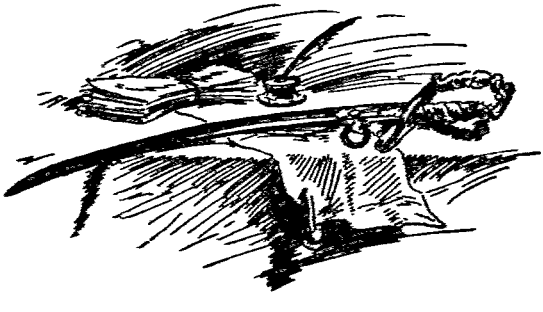
IX. THE BATTERY COMMANDER'S OPPORTUNITY

So much for methods of training. Whatever be the nature of the mode of instruction, it remains for the battery commander to take

counsel with himself and decide whether the training is to be conducted in a manner that will make it an irksome bore, or whether he will endow it with the personality and enthusiasm that will keep and hold the interest and co-operation of every officer and man. The latter course requires a certain sacrifice of time and effort: it means that he must think hard over the planning of a progressive scheme of training which will conform with the schedules published by higher authority, and that he must never go to a drill without having a clear idea of exactly what he is going to do. But the sacrifice is more than worth while; leaving aside questions of duty, it is worth while from an absolutely selfish point of view, because during his service as a battery commander, every officer puts in most of his time drilling or instructing his unit, and therefore it is a matter of self-interest to make these years interesting instead of wearisome. The use of a little forethought, imagination, and enthusiasm will reveal unexpected possibilities in the dullest forms of training. If the battery officers can vary the routine of drill; if they can occasionally introduce the element of surprise; if they can arouse competition; above all, if they can manage to play at war a little: then they will have no difficulty in developing a battery which can be relied upon to acquit itself handsomely in the hottest engagement.

X. CONCLUSION

The fundamental principles of this discussion may be summed up very briefly. First, there are three directions in which we should seek for improvement, namely: (a) we must try to achieve the present degree of proficiency in a shorter period; (b) the time thus saved must be dedicated to the attainment of a still higher level of skill; (c) most important of all, the idea of battle preparedness must dominate every detail of training as it has never done before. Second, proper standardization, which encourages rather than stifles initiative, is essential to success. Third, whatever be the rules laid down by higher authority, no real success in training can result unless the junior officers—battery officers—exercise forethought and imagination in planning their work, and enthusiasm, tempered by common sense, in its execution.



Origin of the Journal of the United States Artillery

By Major Adam E. Potts, C. A. C.

IN 1890 there came to the Artillery School of Practice at Fort Monroe, Virginia, two young officers who were among those to share the idea that the Artillery Corps needed a medium for the expression and discussion of ideas and problems of professional interest for the development of artillery in this country. One of these officers was First Lieutenant John W. Ruckman, 1st Artillery; the other Second Lieutenant Cornélis deWitt Willcox, 2nd Artillery. Shortly after arrival at Monroe, each became aware that the other entertained his pet idea and compared notes to find their ideas practically identical. With the greatest of harmony and cooperation they joined forces to bring into being their conception of an Artillery Journal, and from that time the movement towards the establishment of the JOURNAL received the united and well coordinated efforts of these gifted and ambitious young officers. But it was not until after several severe setbacks that the first number finally appeared in January, 1892.

The first move for the foundation of the JOURNAL was to lay the proposition before the class at the Artillery School. The idea met with approval and moral support, but further than that nothing was done towards its organization, the appointment of an editorial staff, or actual production of the JOURNAL. Time lapsed, and the idea would have died, but for the undiminished zeal of the two originators. In fact, Lieutenant Ruckman later admitted that he had abandoned the project.

Encouraged by the dogged tenacity of his comrade, Lieutenant Ruckman again took up the idea, and these two young school officers together got out the first number of the JOURNAL OF THE U. S. ARTILLERY, (January, 1892), for which Lieutenant Willcox writes the introduction and Lieutenant Ruckman contributes the leading article, a scientific treatise on the "Effect of Wind on the Motion of a Projectile." The second article is a translation from the French by Lieutenant Willcox— "The Determination of the Velocities of Projectiles by Means of Sound Phenomena," by Captain Gossot of the French Marine Artillery. Other articles which complete the first number are: "Our Artillery Organization," by 1st Lieutenant W. A. Simpson, 2nd Artillery, and "Range Tables for the 12-inch Cast-Iron B. L. Mortar," by Captain J. M. Ingalls, 1st Artillery. The issue closes with several reviews of technical books by Lieutenant Willcox.

Whereas it has been my good fortune to serve for the past five years, or thereabouts, under Colonel Willcox, it was not until very recently that I discovered that he is one of the founders of the JOURNAL OF THE U. S. ARTILLERY. When I made the discovery, interest led me to inquire into the details of the early history of the Journal, whereupon he set out certain facts, and I begged his permission to state them through the medium of the JOURNAL he had helped to found thirty years ago.

Colonel Willcox then told me many things; among others, how the JOURNAL was first officially authorized. It was first necessary to get the approval of General Royal T. Frank, then commanding at Monroe, and to show him that the resources of the Artillery School were adequate to a modest beginning. How modest this beginning was may be inferred from the fact that with only one hundred subscriptions, it was thought that success would be assured. To the enterprise General Frank gave his warmest support and encouragement. The selection of a Committee of Five resulted, but the practical work of getting out the first issues devolved upon the two founders, as reference to these first numbers will show.

The following is the original Committee of Five:

1. 1st. Lieut. Wm. B. Homer, 5th Artillery
2. 1st. Lieut. H. C. Davis, 3rd Artillery
3. 1st. Lieut. J. W. Ruckman, 1st. Artillery, Treasurer.
4. 1st. Lieut. C. deW. Willcox, 2nd Artillery, Secretary.
5. 2nd. Lieut. L. G. Berry, 4th Artillery.

The JOURNAL first appeared as a quarterly; subscription price, $2.50 annually, single copies, 75 cents. After it had been in existence about two years the Krupps in Germany forwarded their subscription, at the same time requesting all back numbers in addition. Foreign comment was immediately excited and many generous and encouraging predictions noted in the columns of both domestic and foreign scientific periodicals. Thirty successful years since then have fulfilled these prophesies.

It is of casual interest to note that even the red cover design adopted by the founders, and since retained, has been practically conventionalized by adoption by other journals devoted to the interests of the artillery.

Colonel Willcox tells the amusing story that when an exchange was requested of a well-known technical journal, the latter replied that they exchanged only with purely scientific publications. A few months later it was this journal that requested exchange.

Another interesting anecdote concerns an article by General E. M. Weaver—("Seacoast Guns and Steel Armor," April, 1892). It was first submitted to the Military Service Institution, published at Governors Island, but refused. However, when published in the JOURNAL OF THE U. S. ARTILLERY, it created such comment that a second edition of the JOURNAL was necessary to supply the demand.

Subcaliber practice had its origin in an original article by Lieut. Ruckman, appearing in the JOURNAL, April, 1894, entitled: "Coast Artillery Fire Instruction." Poor gunnery at this time had provoked a heated debate in which the leading artillerists had expressed their views for remedial measures. The recommendations of Lieut. Ruckman at this time formed practically the basis for our present system of training.

An article, "The Angle of Jump and Its Measurement," by L. V. Benét, Artillery Engineer of the Hotchkiss Co., Ltd., Paris, immediately attracted the attention of gun makers the world over. So important did this article appear to the Ordnance Department, U. S. A., that it at once republished the article as an *original* "Notes on the Construction of Ordnance."

Other articles of interesting origin and important bearing too numerous to mention have since appeared in the JOURNAL'S pages. The above are cited merely to show the immediate value of the JOURNAL at the time of its foundation, and that its success was assured from the start, because of the important role it was destined to play in the development of artillery in this country and abroad.

The JOURNAL OF THE U. S. ARTILLERY was indeed fortunate to have had as its founders such able and far-seeing men as Ruckman and Willcox—men whose long service has been a rapid succession of important undertakings and brilliant achievements. The thirty years of uninterrupted success of the JOURNAL are largely due to its zealous, brilliant and practical originators, who set the standard so high that their successors have been, of necessity, carefully chosen men who have builded well upon the foundations laid by these two pioneers.

As a proof of this assertion, in conclusion, is quoted in full the introduction to the first issue of the JOURNAL, written by 1st. Lieut. C. deWitt Willcox, 2nd. Artillery, now Colonel and Professor of Modern Languages, U. S. Military Academy. The arguments advanced therein are as true to-day as they were thirty years ago. The Artillery and the Country owe a great debt to these two able and progressive officers—*Major-General John W. Ruckman and Colonel Cornélis deWitt Willcox.

"ANNOUNCEMENT.

"By this, the first issue of the JOURNAL OF THE UNITED STATES ARTILLERY, is realized, we venture to believe, a hope long-cherished by the more progressive officers of the arm. It seems hardly necessary to-day to enter at length into the reasons for establishing an Artillery Review. What those reasons are is all but unanimously appreciated; justification of the step taken is hardly needed. But it may not be amiss briefly to sum up a few points that ought to engage the earnest attention of our officers. In no branch of the military service is progress so rapid, development so unexpected, as in the Artillery. Almost all the arts and industries are drawn upon to furnish in greater or less degree, their share in extending its sphere, in widening its application. War grows more and more exacting in the

*General Ruckman died June 7, 1921.

requirements it makes of those who make its practical study their profession. True of all arms, this remark applies with peculiar force to our own, for it is in it especially that progress opens up an increasingly widening field. For us, the development of our artillery is of especial interest. The proper organization and administration of this arm is perhaps the great purely military problem that calls for solution in our land. For one great and essential difference exists between the war-conditions that this country may have to satisfy, as compared with those of other first-rate powers. So far as these are concerned, it is almost demonstrably certain that the theatre of any armed struggle into which circumstances may force us, will be our maritime borders. And this means that our artillery must be prepared for the duties that will then devolve upon it, not only as regards instruction of officers and men, but also as regards organization and administration.

"These remarks perhaps make clear the object we hope in some measure to realize by the establishment of an Artillery Review. It will be devoted to the discussions of problems within the limits of our professional interests. As artillery literature is increasing day by day in volume and interest, so it will be the aim of the JOURNAL, in some sort to serve as a guide to those engaged in research and investigation.

"Turning now to the more special consideration of our endeavor, we deem it to be a requirement of simple justice to state that the establishment of a professional paper has been made possible only by the generous encouragement and wise liberality of the Commanding Officer of the Artillery School. The nature and extent of the obligation under which the Artillery thus rests can be revealed only by experience. For the present we shall content ourselves by saying that to this wise action is it due that we of the Artillery at last possess a medium of inter-communication of our own, under our own control, and devoted with eye single to the interest of our arm.

"The JOURNAL, for the present, will appear as a quarterly. It is temporarily under the editorial management of a committee of five, designated by the Staff of the School. Assuming that no one will question the soundness of making this the home of the JOURNAL, it remains but for us to recognize by acknowledging to them the probable existence of obstacles and difficulties, to be removed only by time, patience and experience. Hence, we bespeak in advance the kindly support of those who will be affected for good or evil by the success or failure of the enterprise, in which, whether willingly or unwillingly, we all have a common interest.

(C. DeW. W.)"

Organization and Command of the Heavy Artillery of An Army Corps

By Commandant Perney

Translation prepared by Major F. P. Hardaway, C. A. C., for the COAST ARTILLERY JOURNAL *from "Revue Militaire Generale" for July, 1920.*

AT the end of the war, the heavy artillery of the army corps consisted of one regiment of horse drawn heavy artillery comprising, normally,

2 groups of 105
1 group of 155 long, Schneider, M-1917

However, many army corps had, instead,

1 group of 155
1 group of 120 or of 95 (seldom the latter)
1 group of 155 long, old model of 1877-1914.

The latter arrangement provided only one group of modern artillery for each army corps. The two other groups were equipped with very slow, heavy, and cumbersome guns of old model which arrived after the operations despite the fatiguing efforts of the personnel—a thing which must not happen again since in the offensive as well as in the defensive, in pursuit as well as in retreat, a commander has need of all his weapons and good weapons, too, in order to act effectively and rapidly.

We will leave out of consideration all this old model artillery, undoubtedly useful for many purposes in stabilized warfare, and concern ourselves only with equipment better suited to the exigencies of future wars. For the present this means guns of 105 and 155 long, Schneider. M-1917. These are corps artillery weapons suitable for,

Counterbattery work and protection of divisional artillery;
Harassing fire;
Interdiction fire;
Destruction (by 155mm. guns)

Three groups for all these tasks are few, indeed.

Undoubtedly, some will contend that in the divisional artillery, there are batteries reserved, in case of need, for counter battery work and the 75 can fulfill this mission especially with its increase in range.

We raise no objection to this view, realizing that the field gun is a weapon that is effective against both hostile artillery and infantry not only in open warfare by reason of rapidity and volume of fire but

even in stabilized warfare because of its effect on casemated batteries; one shot entering the port of a casemate is capable of putting out of action a whole gun crew and such a shot has a greater probability of occurring in 1000 fired from a field gun than in 200 fired from heavy artillery.

However, if there exists a weapon of the same characteristics but having greater power and longer range, why not utilize it on a larger scale by increasing the number of batteries in the corps artillery and leaving to the divisional artillery its mission of attacking infantry, except in unusual cases?

Now this weapon is the 105 which has been tested during the war, and the two groups of 105 provided or rather contemplated for each army corps should be increased to three.

Likewise, for similar missions but where speed is not as essential though the task of destruction be added, it is not unreasonable to create another group of 155 long, Schneider, M-1917. Thus the corps heavy artillery would be composed of

3 groups of 105
2 groups of 155 L. S., M-1917.

This solution of the problem will appear logical and necessary when one considers the end to be attained. Also, in an advance guard consisting of one division, a group of 105 could very well be placed in the midst of the divisional artillery with the object of firing upon and silencing the hostile artillery. A group of 105 so placed and whose fire was regulated by an accompanying plane would accomplish excellent results and would serve as a trump card in a battle. Moreover, this group, though detached, could remain under the orders of the general commanding the corps artillery (however, the place of the 105 on the march, its drill, and equipment, based on past experiences, will be taken up in another article.)

After having set forth the view that the corps heavy artillery should, by all means, consist of five heavy groups named above, let us turn our attention to the organization of groups of 105.

ORGANIZATION OF GROUPS OF 105

Before considering the composition of groups of 105, we will describe briefly the characteristics of the gun.

As to mobility, the 105 is the equal of the 75; drawn by eight horses, obstacles present no difficulties and movements at a trot can be made as easily as with a field gun. The trot, however, will be as rare for one gun as for the other, even on the road, as was demonstrated during the war.

In the matter of rapidity of fire, the 105 was able to fire when necessary (offensive of Champagne, 1915, and defense of Verdun, 1916) 8

to 10 shots per minute per gun. Later, the rapidity was limited to 3 shots a minute because of the wear of the gun and the difficulty of supplying ammunition. For the same reasons, the 75 had been limited to 6 shots a minute.

As far as range is concerned, the 105 projectile attains 12,500 meters with a charge of 2 kilograms of B. G. 5 powder giving a muzzle velocity of 570 meters. The range is 10,500 meters with the charge weighing 1.900 kilograms giving a muzzle velocity of 550 meters.

As to power, the shell contains about 2 kilograms of explosive.

It is an excellent gun, mobile, quick-firing, of long range, powerful, and provided with an irreproachable carriage which has never given cause for disappointment. In a war of movement, either in advance or retreat, it is an exceptional weapon for the purpose of harassing the hostile columns, of disorganizing them, and sapping their morale by constant annoyance. A gun with such qualities should be seriously considered and it is urgent that drill regulations be written and approved range tables prepared.

The organization of groups of 105, which has been changed continually during the war, can now, after the experience gained, be definitely prescribed. At the beginning of the war it was the same as for the 75 as laid down at the general bases of artillery instruction. Later, some changes were made because of the discontinuance of the combat trains whose place was taken by the artillery section of the ammunition train. Finally, towards the end of the war, the reappearance of the combat trains brought more modifications and the excessive losses of men and horses in the firing batteries made it impossible for groups of 105 to continue their mission of pursuit and harassing fire and prevented them from going into action with the advance guard and opening the artillery duel.

Without entering into details or quoting all the orders and circulars reducing the strength in men and horses and even in equipment, the composition of a group of 105 should be fixed at:

Three firing batteries (of 4 guns and 6 caissons each and 1 reconnaissance car with an echelon comprising: 1 battery wagon, 1 forge, 3 baggage wagons);

A combat train of 36 caissons (12 per battery) replenished by the artillery section of the corps ammunition train. As the caissons contain 42 rounds, the total ammunition supply on hand, including the 18 caissons of the 3 firing batteries, would amount to 2268 rounds;

A regimental field train composed of forage, ration, and baggage wagons.

There must be added:

per battery
- 1 N. C. O. and 3 privates-telephoners.
- 2 privates for the machine gun.
- 4 drivers (the guns being drawn by 8 horses.)

per group
- 2 N. C. O. and 10 privates-telephoners.
- 2 radio operators, 1 driver and 1 wagon for the radio set (receiving and sending).
- 1 driver and wagon for topographical instruments.
- 2 drivers and 1 reconnaissance car.

This will increase the number of horses required; the number may be easily computed. Thus constituted, the group of 105 would respond to all demands made upon it and they are numerous when one considers the accomplishments and services rendered in the recent war. Enemy officers, made prisoner in the second battle of the Marne and in September, 1918, have reported, among other things, that the French batteries of 105, opening fire in advance, played havoc with their troops in rear and that because of the continuous harassing fire, their men "could not rest either day or night." And, at that very time; these groups were already reduced in strength and weakened by losses in matériel not made good.

What would have happened had the groups been organized as recommended above or even as they were at the beginning of the war!

But we must admit that they could not have long kept up the pursuit had they remained organized as prescribed in January, 1918, because of lack of men and horses.

As far as the staff of the group is concerned, it should remain as provided for in the instructions of February 19, 1919, namely, nine officers including the group commander, the medical officer, and veterinarian.

COMMAND OF THE CORPS HEAVY ARTILLERY

The Manual of the Battery Officer published in 1918 defines in the following terms the role of the commanding general, corps artillery:

"The brigadier general commanding the corps artillery is the technical adviser of the corps commander and chief of artillery of the army corps. He commands the corps artillery as well as units of the general artillery reserve, etc."

Now the corps artillery is a regiment of heavy horse drawn artillery composed of 2 groups of 105 and 1 group of 155 L. S., 1917, commanded by a colonel or lieutenant-colonel who is under the commander of the corps artillery as the commander of the divisional artillery is under the division commander.

How should the command of this corps heavy artillery be exercised practically? First of all, we have the commander of the corps artillery and his staff.

Then the commander of the heavy artillery who has under his orders in a period of stabilization the groups of his regiment and the foot batteries pertaining to the sector and sometimes several detached batteries or groups of horse drawn artillery.

These batteries are organized as groups of corps artillery and the groups are added to others.

Figure 1 shows, theoretically, the disposition of the groups with reference to the heavy artillery headquarters and the headquarters of the commanding general, corps artillery. (In certain cases, groupings are formed as we shall see later).

Let us suppose that the foot artillery, already in position or arriving in large numbers in the sector, is commanded by a colonel or lieutenant-colonel senior to the one commanding the corps heavy artillery. The arrangement is changed and we may, either leave the groups of horse drawn corps artillery under the orders of their chief and the batteries

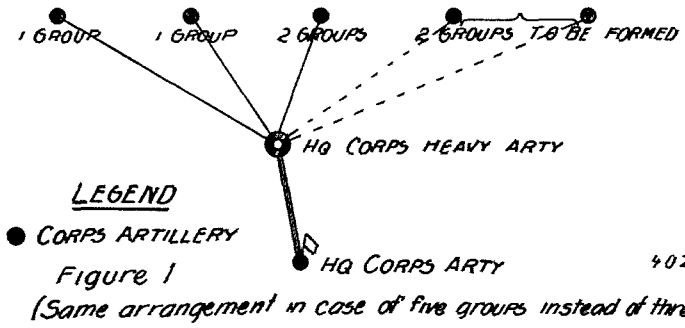


FIG. 1.

of foot artillery under their own commander which gives rise to two distinct groupings, or divide the front occupied into two sectors and place the units in one sector under the heavy artillery commander and the units in the other sector under the foot artillery commander; here again we have two groupings; in both cases, they are directly under the commanding general of the corps artillery (Figures 2, and 3).

The general transmits his orders both to his heavy artillery commander (to whom he has become accustomed and who remains directly under his orders) and to the foot artillery commander as shown in figures 2 and 3. The will of the commander who is the chief thus continues to be carried into effect. It is a just division of the work and responsibility which takes into account the characteristics of each and does not injure the pride of anyone.

It is the duty of the general to choose one or the other plan having in mind the aptitude of his officers, the exigencies of the service, and the dispositions on the ground.

The question would be solved in a similar manner if there arrived reinforcements of horse drawn artillery commanded by an officer of the same grade but senior to the commander of the corps heavy artillery.

If necessary, another grouping would be formed under the direct orders of the commanding general, corps artillery, and the latter's staff would be organized accordingly.

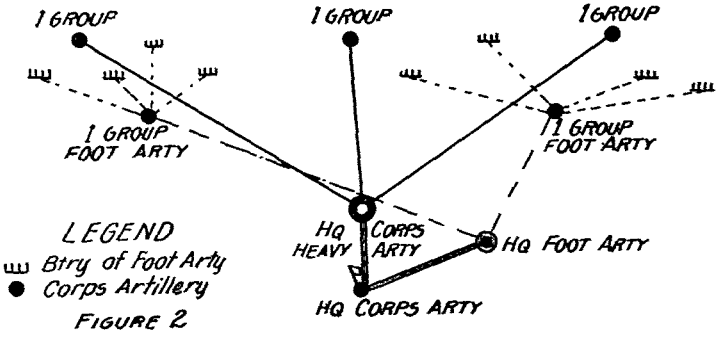


FIG 2

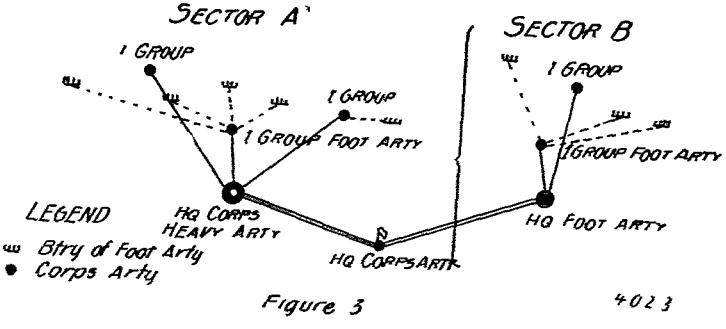


FIG. 3

The important thing is for the heavy artillery commander, who is used to working with his general and who is "broken in" according to the latter's taste (if we may put it that way,) to remain directly under the orders of his chief; the latter may then establish one or more groupings which will also be under his immediate control.

THE COMMAND OF THE HEAVY ARTILLERY

It is the normal practice and in accordance with regulations for the commander of the heavy artillery to exercise direct command over his group commanders. The scheme of appointing a grouping com-

mander from among the three group commanders as an intermediate between the latter and the heavy artillery commander (when there are only three groups in position) is to be rejected from every point of view.

If several reinforcing batteries arrive, they may either be divided among the groups already in position or be formed into an additional group.

This is the scheme shown in figure 1 with an additional group directly under the orders of the heavy artillery commander.

The dispositions shown in figure 4 should not be adopted as it entails an unequal division of work and a shifting of responsibility that can not but cause confusion and delay in carrying out orders; moreover, the grouping commander must obtain a staff of officers and specialists by details from other groups that have only the minimum personnel, especially in active periods. Besides, one staff remains unemployed, namely, the heavy artillery staff since the grouping does the work.

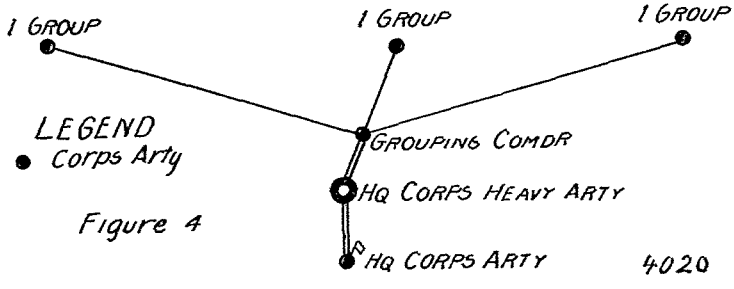


FIG. 4.

However, if other groups arrive to reinforce the existing heavy artillery, then the division into groupings is not only recommended but it is quite necessary. The group commanders, with their staffs, become grouping commanders and are intermediate between the groups and heavy artillery headquarters. Then their batteries are divided among the other groups or remain under their orders; the increase in work is held at a minimum (See figure 5).

We have endeavored to cite several examples showing what dispositions should be made while allowing each unit commander to retain his prerogatives, his command, and his responsibilities. Each condition has its own solution and we have not been able to consider every contingency.

It is, however, in this spirit and in this manner that we must act; every superior officer, in creating groups or groupings or other units differing from the normal, must have the good of the service at heart and take into account the physical and mental characteristics of his subordinates; also, he should not transfer his functions and responsibility to others.

The number of groups that may be placed in a grouping is variable, but four or five would seem to be enough under one command; it is a difficult duty, and very complicated in the matter of supervision, and transmission and execution of orders; the work of maintaining telephonic communication, verifying firings, and preparation of missions would be at a maximum. Rarely should there be more groups in a grouping.

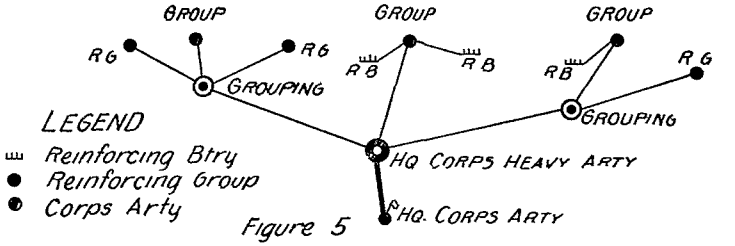


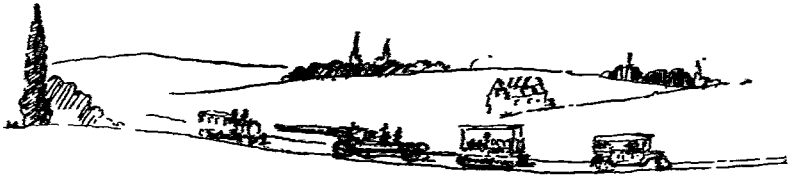
Figure 5

(In case the groups of Corps Artillery were increased to five instead of three, the general scheme would be the same as in above diagram) 4021

FIG. 5.

We have purposely dealt at some length on this question of the command of the heavy artillery, the groupings, and groups because, during the war, the functions of command have not always been well understood or properly apportioned and it has too often happened that certain headquarters were created between the groups and the heavy artillery command which might have been avoided had everyone retained the tasks belonging to him and not shifted them to subordinates who had difficulty in accomplishing them through lack of proper means.

Finally, the place of the heavy artillery commander is with the general commanding the corps artillery. Grouping commanders are near their groups and group commanders with their batteries.



Mental Conflicts in War

By Dorrell G. Dickerson, M. D.
of Washington, D. C.

THE War of 1917 has taught us many things but perhaps one of our greatest lessons has been the appreciation and understanding of those factors which build up the soldiers' morale and those forces which undermine and destroy the self-confidence of the men, the pyschological unity and the morale of the military machine. In no other war during the history of man have such large numbers been engaged on the field of battle and at no other time have conditions been so favorable for the observation and study of soldier psychology, as during the conflict between 1914 and 1918.

From the very beginning of mobilization the United States undertook steps to build up the morale and general mental stamina of its forces. Many civilian organizations were called upon to give aid and assist in the welfare of the troops both at home and overseas. The Central Training Camps Activities was organized to furnish amusement and help maintain the spirit of contentment so vital to men away from home. Morale officers were sent into the camps and overseas to encourage and fortify the men against disheartenment and lagging spirits. Every effort was made to build up and maintain the highest morale in our armies. Practically every great military leader has recognized the fact that the success of any war depends fundamentally upon the individual soldier. His morale and self estimation must be constantly re-enforced during the changing fortunes of war.

It has often been stated that every great war is a universal neurosis. War may be compared with a tremendous wave of hysteria sweeping through nations. It fluctuates from the extremes according to the emotional elevation and depression of the individual. The constant minor irritations, insults, jealousies, commercial antagonism, etc., all act as so many pin pricks, unnoticed or unresented by the general herd for years yet stimulating in the subconscious depths of the people those slowly moving forces which gaining momentum from year to year finally break forth in actual war. This is well represented by the Spanish-American War and the events which eventually led to a declaration of war. Again, consider the Great European War and the many petty events which finally led up to the greatest war of all times. The same forces are now at work moulding public sentiment for wars to come. Ordinarily those things which are of more or less little moment to the

general mass are repressed and shoved back into the deeper recesses of the mind. Repression will hold these forces in check for a time but sonner or later there must be an outlet for the accumulated material.

The human mind may be compared with a river, except in the mind there is a stream of ideas, sentiments and other mental processes. Like a river with its upper and its lower levels so can the mind be likened, the upper levels of the mind being called the conscious and the deeper levels the unconscious. Just as there is no line of demarcation between the upper and the lower levels of the river there can be no definite line drawn between the conscious and the unconscious. Mental things which at this moment are in the upper or conscious parts of the mind are in a second submerged into the deeper or subconscious levels. Everything with which we come in contact in our environment is taken note of. No matter how trifling, insignificant or what not, these things are noted and then passed on so to speak to the subconscious, the store-house of the mind. More painful or horrible experiences or happenings are indelibly impressed upon the mind and there is always a constant effort to repress these painful things into the depths of the subconscious. We do not care to think of them and they are banished from consciousness, but not from the mind. These repressed mental things are always bobbing up into consciousness from time to time, but in some instances they are entirely forgotten as far as the conscious mind is concerned.

Among those mental elements or instinctive things making up the subconscious mind are the instincts. These are the prime movers of life. Civilization and the things which go with it are gradually eradicating the instincts from human kind. Generally speaking, instinct is an innate tendency or automatic mental and physiological response to certain external influences in our environment which excite definite emotional reactions. Instinct is made up of three parts: perception, emotion, and action. Every instinct is made up of these three elements, each inseparably linked to the other. As an example of this, suppose an unarmed man is walking down a lonely road; he is suddenly confronted by a wild beast. What occurs? He perceives the animal, becomes frightened and at once takes flight. We then see that the instinct of self preservation is composed like all other instincts of three parts. The perception of the animal at once arouses the emotional element of fear and the resultant flight from danger is the reaction to fear. Some of the instincts to which man is heir are: pugnacity, revulsion, curiosity, self-assertion and self preservation. Probably the strongest instinct is that of self preservation. It is this instinct which in time of war plays the greatest part in the morale and mental stamina of troops. Fear is the emotional part of self preservation and exhibits itself by characteristic phenomena. These are: a startled expression, cold clammy perspiration, palpitation of the heart, inability to speak, dryness of the mouth, a sinking feeling in the chest, short shallow breathing and general

trembling of the entire body. In addition to the primary instincts there are several other innate tendencies of man which may also be classified under the instincts, the chief of these being the herd or gregarious instinct. It is this innate tendency which causes men to gather together or to group themselves into communities. It is also the manifestation of those forces or the gregarious instinct which causes men to form groups either religious, political or social. Protection lies in the collective organization of man and the herd instinct simply represents the age old force that has taught us to seek companionship in our kind both for the good of self and community.

Floating in our river of mental activity are certain groups of ideas, instincts, sentiments and things of personal interest. These are often referred to as complexes for the sake of convenience. The driving force of the complex is derived from the instincts. One of the most important complexes of human kind is the self complex. This is made up of ideas grouped about oneself; it is composed of the instincts of self-assertion, self submission and of the herd; the ideas of self respect, of self esteem and of the sense of duty. This complex enters into every daily activity. In addition to this there are many other complexes which enter into our lives but these are more or less subservient to the self complex. Religion, love, finance, politics and the various hobbies help to make up a host of complexes. In the everyday normal life conflicts arise between these complexes. One or the other is striving for the mastery. Love and religion may come into conflict or the political and self complex may collide. War brings into prominence two of the strongest complexes inherent in man, namely, the self complex and the self preservation complex.

Just preceding and at the beginning of the War of 1917, there was a tremendous strengthening of the self complex. The speeches made in Congress, by the President and by representatives of foreign governments, fired the land with partiotism. The declaration of war sent a thrill throughout the nation. Every red blooded man responded within to this wave of patriotism. On every hand the steps of marching troops, the waving of banners and the strains of martial music raised the war spirit to fever heat. Very few self-respecting men could afford to remain out of the service. In the beginning the war aroused the instinct of curiosity, a sense of glamour and thrilled everyone with the spirit of adventure. In the training camps the drill, competitive sports, the sham battle and esprit de corps further elevated and strengthened the self complex. The latent instinct of pugnacity was stimulated by the battle drills, bayonet exercises and the fierce yells of the charging troops. By a combination of the various instincts we have developed in the soldier a powerful driving force which is urging him on to do his duty.

Let us now turn our attention to the other participants in this field of mental action. Let us examine the make up of the war complex

which derives its driving power from the instinct of self preservation, perhaps the greatest of all instincts. In the beginning before the soldier has entered the theatre of operations this complex is dormant and insignificant when compared with the self complex. Perhaps nothing has yet occurred in the life of the soldier to stimulate and arouse this powerful instinct. When the soldier reaches the theatre of war or comes under the fire of the enemy another picture presents itself. The small and insignificant war complex immediately begins to grow and expand. The instinct of self preservation now comes to the foreground. The soldier begins to think of home and relatives and speculates on injury and death. Constant shell-fire, improper and insufficient food, long dreary hikes and the sight of wounded and dead comrades all add to the "fed up" feeling and give momentum to the ever growing force of self reservation. All of this gives strength to the war complex and weakness to the self complex. The trench life and intolerable existence of the battle area drive the soldier nearer and nearer to flight. The knowledge that flight from the front spells death and disgrace holds the soldier in check and forces him on to meet the situation. Many men would gladly welcome a wound or the loss of a limb in order to escape from the hopeless situation. Perhaps many would even welcome death rather than continue in the face of such circumstances. As the fortunes of war fluctuate from day to day these mental forces vary to keep pace with the changing situations. Gradually but surely there is a weakening of the self complex and a strengthening of the war complex. These two forces are driving head on, approaching one another from opposite directions. Sooner or later they come into collision; in other words there is a conflict of the complexes of self and war. The instincts of self and self preservation collide. Some acute or sudden accident of the battle field such as the bursting of a shell nearby or the cave-in of a trench may suddenly tip the balance of this mental battle and the soldier "blows up" or is "shell shocked." With this sudden upset there is a powerful emotional explosion and loss of equilibrium or mental poise. Sometimes the soldier may pull himself together and regain mastery over the powerful self preservation instinct by asserting the self complex. Of necessity this requires the repression of the emotional components of fear and the forcing of natural reactions into the unconscious. Such a mechanism as this requires the expenditure of great mental effort and brings about nervous disorders later on. The soldier may succeed in banishing his fear from consciousness but not from the mind. This method of repression is only a temporary thing and sooner or later the repressed fear will re-assert itself in diverse symptoms commonly called "nervousness."

After these unpleasant experiences have been driven from consciousness a sort of mental barrier is erected shutting out all of the horrible experiences of that particular part of his military life. In this process

of repression into the subconscious a complete forgetting may occur, the soldier may forget many events of his life but more especially the terrifying escapes of the war. He is always consciously trying to forget his war experiences and withdraws from a conversation on the war. His efforts are always directed towards securing some means of distraction in order to push from his mind the war. Unfortunately it is impossible to forget entirely. No one can remove by a volitional act or desire painful terrible experiences; they have been burned into the subconscious mind. The repressed instinct of self preservation cannot be completely shut out; it is a dynamic force and refuses to be controlled. Consequently, there is always a certain amount of mental energy being used up in this attempt to inhibit self preservation. In re-asserting itself the instinct of self preservation very conveniently takes the form of fear, its real emotional element. These fear or fright signs are: trembling, crying, profuse perspiration, fluttering heart, frightened expression and dilated pupils. The repressed battle experiences again come into consciousness in the form of terrifying dreams and horrible nightmares. The soldier cannot concentrate on his work and is unable to adjust himself to the activities of normal life. He is again fighting a battle, but this time it is a mental one, a combat between the conscious repression and the unconscious fear which is striving to escape from the unconscious.

It must be recognized that soldiers who break down and develop so called "shell shock" are not cowards in any sense of the word. They are only exhibiting the reactions from a conflict of the two complexes. Even the bravest of the brave are prone to develop these nervous disorders. Officers and non-commissioned officers upon whom the sense of responsibility rests so heavily are frequent sufferers from nervous disorders dependent upon mental conflicts. I have known quite intimately several officers, decorated with the D. S. C. who presented typical and well marked nervous states brought about by such conflicts. They readily admitted extreme fright while under shell fire, but repressed this fear and hid it from their men. Many refused even to admit to themselves that they were frightened. Our future preparations along military lines should take into consideration the psychology of this conflict of the complexes and company officers should receive a thorough training in recognizing the onset of these mental conditions. Many more men could be kept in the lines, if impending nervous breakdowns were detected early and these soldiers removed. The influences of suggestion sometimes act upon men who witness comrades in an acute state of "nerves" or "shell shock." Sometimes a brief rest will save a soldier from a breakdown.

A Single Base Line for a Fire Command

By Major Fred Seydel, C. A. C.

PRESENT day opinion appears to favor concentration of fire of the units of a fire command upon a single target. Without discussing the merits of such conduct of fire it does seem advisable to have one base line supply data to as many units as possible. A brief consideration of the problem proves that it is impossible for any one base line to supply data for two or more batteries simultaneously. A mechanical device may in time be constructed by which the delay in supplying batteries after the first may be reduced to the time re-

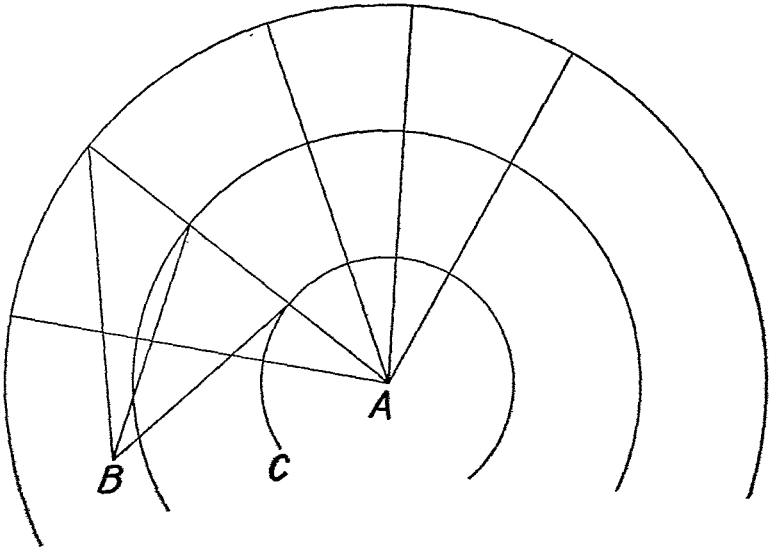


FIG. 1.

quired to punch two or more keys in succession. Any method, mechanical or not, requires relocation.

A means of obtaining data for an indefinite number of batteries or other units by using only one base line is described below. After obtaining data for the first unit the data for all remaining units may be supplied simultaneously with a delay of a very few seconds.

Referring to Figure 1, A, B, and C, are the directing points of three batteries of a fire command. A base line supplies data for A. To con-

vert this data for use at B and C describe circles or arcs of circles for each four hundred yards of range about A, covering the field of fire. Draw in radii. The radii should intersect the circles at each four or five degrees of arc.

Any single circle, of course, indicates points of identical ranges from A. The points on that circle indicate varying ranges from B and C. Measure the range from B to each intersection with circle of the radii drawn from A. Plot these ranges as follows:

(a) On a horizontal line at intervals of one inch or three-fourths inch draw vertical lines. (These vertical lines represent azimuths from A and correspond to the radii drawn).

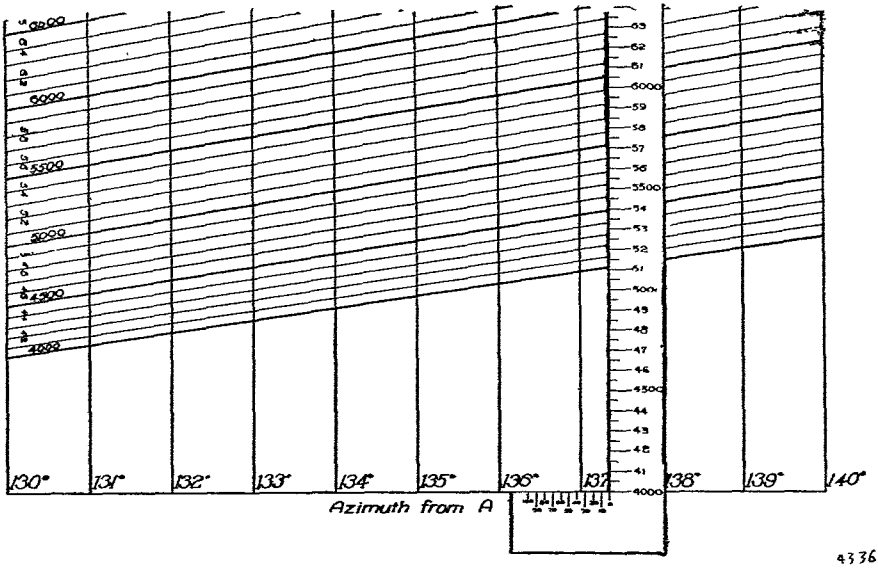


FIG. 2.

(b) On each vertical line measuring from the horizontal line as origin, and to any scale adopted, say, 300 yards or 400 yards per inch, lay off the range *from B* to each intersection of radii and circle. (This marks points at ranges *from B*, but on azimuths *from A*).

(c) Connect the points obtained and mark the curve at intervals by numerals indicating the range of the circle from A.

(d) Proceed in like manner for other circles drawn about A.

We now have a system of curves for use in converting the range from A to range from B. A T-square bearing a range scale on its edge and with a sub-scale on its head (to allow setting its edge at hundredths of a degree) is placed on the curves. As the azimuth of a predicted point is called off by the range section for A, the T-square is set at the azimuth called. When the range from A of the predicted point is called it identi-

fies one of the curves. The intersection of this curve with the edge of the T-square enables the operator to read and call off the range *from B* of the predicted point.

Figure 2 shows the curves as they appear when worked out for two batteries nearly 5000 yards apart. Figure 3 shows the general shape of the curves when plotted for a field of fire of 360 degrees.

Other units, as C, D, etc., obtain the data from A simultaneously with B and ranges to the units are supplied simultaneously, each unit being supplied from its own set of curves.

Similarly curves for azimuths may be constructed and operated.

If the curves cover an extensive field of fire it is better to mount them on a cylinder. The T-square should be fixed in position and the cylinder turned so that the azimuths as called may be brought to the edge of the T-square bearing the range scale. With a scale of 1-inch equals 1 degree, a set of curves (range) covering a 120 degree field of fire will require a cylinder 3.19 feet in diameter.

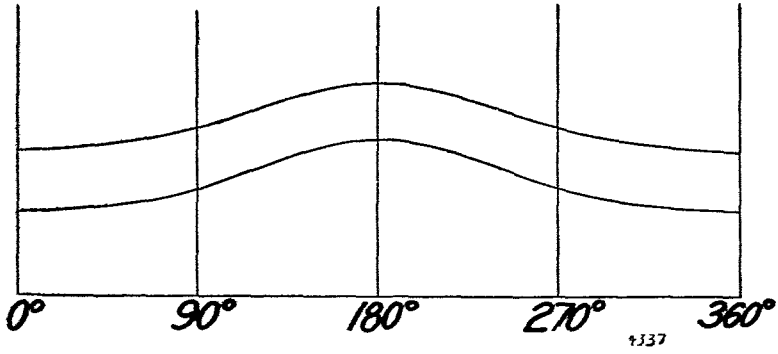


FIG. 3.

The curvature of the curves is very slight—imperceptible for a change of a few degrees, See Figure 2. This results in better intersection and lessens the possibility of errors in interpolation and reading as well as facilitating the actual construction of the curves. A set of curves covering a 120 degree field of fire may be constructed by one man in less than a week.

All measurements may be made graphically. Selected points should be checked mathematically. Note that lines drawn from B to radius from A result in the formation of triangles of equal area. This affords a rapid means of mathematical calculation by interpolation in the third order of differences.

The method has a special application in the case of long range guns. It is frequently desirable to deliver fire on a target in certain remote sectors for which it is impracticable for the established base lines to supply data. See Figure 4. A and B are two forts. It is evident that

B cannot deliver fire on the sector east of A unless the base lines at A are used to supply data for B. It is also evident that neither A nor B can fire in the water area to the north unless base lines are established along the north coast line.

In either case, because of the mechanical difficulties, created by the great distances, in the construction of a plotting board, some system of relocation becomes essential.

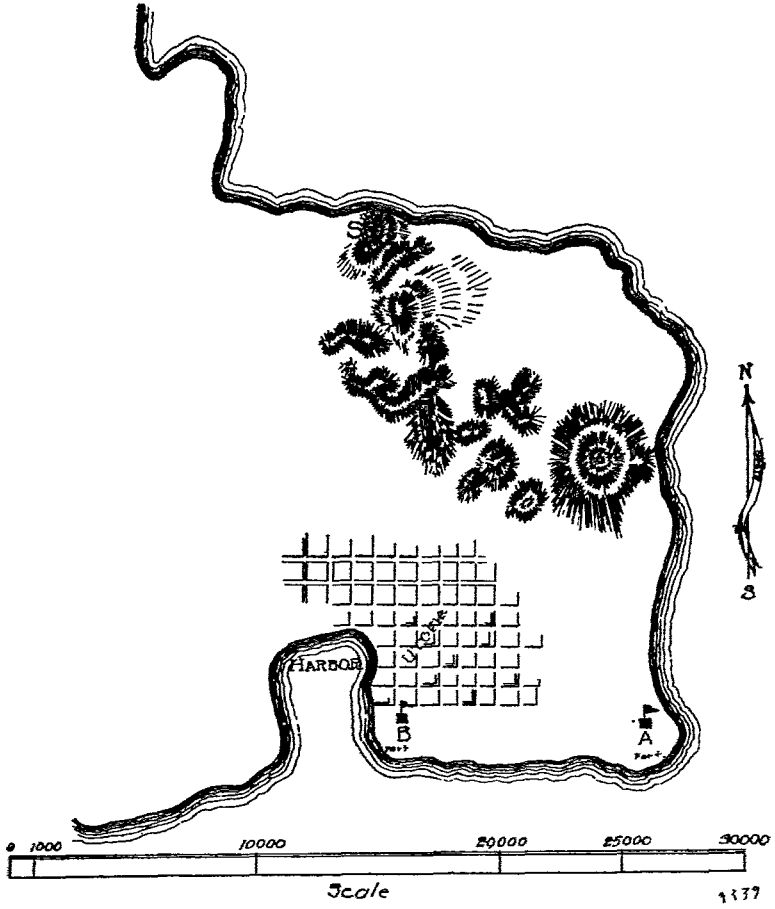


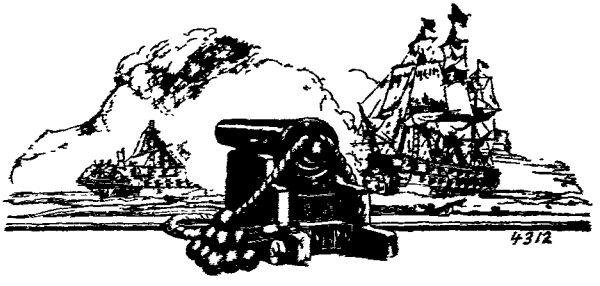
FIG. 4.

Suppose a target is east of A. The base lines at A are being used to supply data for the batteries at A. It is desired to bring the batteries at B into the action. Two men located in the plotting room of any battery at A, and provided with a system of curves as described above, can supply ranges to a battery at B. Two additional men can supply azimuths. The data supplied the battery at B will be supplied about

three seconds after the corresponding battery at A receives its data. Four additional men can supply data for a second battery at B, etc.

Suppose a target is in the water area to the north. A station at S provided with a D. P. F. can supply data to all the batteries at A and B. This data is converted for each battery's use by using the curves.

The use of this system for such situations as described for Forts A and B obviate the necessity for the use of rectilinear coordinates involving as they do plotting, conversion, relocating, and the handling of cumbersome figures through a multiplicity of tedious operations.



Courtesy E. I. DuPont De Nemours & Co.

The Army Music School

By Major Edward L. Dyer, C. A. C.

HISTORY OF THE SCHOOL

TEN years ago the Institute of Musical Art of the City of New York placed ten free scholarships at the disposal of the Secretary of War for the purpose of training bandleaders. Five carefully selected men commenced the course in 1911, and five more in 1912, thus filling these scholarships, as the course lasted two years. Each year following has had its class, and to date 48 men have graduated as qualified bandleaders, each equipped with a first-class musical education.

To supplement the instruction received at the Institute of Musical Art, Captain Arthur A. Clappe, a graduate of the Royal Military School of Music (Kneller Hall, Hounslow, England), and later bandleader of West Point for eight years, was placed in charge of the students as principal to supervise the practical and military phase of their training, with station at Fort Jay, Governors Island, N. Y.

In 1915 a recruit practice band of 25 men was added to Captain Clappe's command to afford opportunity for practical band control and direction. Members of this band also received instruction. In 1920 Captain Clappe died and the school lost a talented director and a most able teacher. He had been the father of the school, and had earned well-deserved recognition, both for himself and for his organization.

William C. White, for four years a student at the New England Conservatory of Music, in Boston, and a graduate of the Institute of Musical Art, was Captain Clappe's assistant for five years, and succeeded him as principal of music. John S. Martin, a graduate of the New York Institute, was appointed assistant principal.

REORGANIZATION

In the early part of 1921 the school was reorganized, enlarged and designated as "The Army Music School." In September 1921 it was transferred from New York to Washington Barracks, severing its advantageous relations with the New York Institute. However, The Army owes much to the directors of the Institute and to its distinguished head, Frank Damrosch.

As at present organized, General E. F. McGlachlin, U. S. A., is commandant of The Army Music School; Major E. L. Dyer, C. A. C. is assistant commandant, in charge of the general administration of the

school, and Mr. White and Mr. Martin are at the head of the musical department of the school and of the faculty.

Mr. William J. Cain is executive officer of the school. Other members of the faculty are; James C. Eldridge, Manuel Comulada, Carl E. Everlof, George E. Zepf, Rocco Resta and William J. Stannard. Mr. Stannard is also leader of the Army Music School Band.

COURSES OFFERED

The courses given at the school include the bandleader's course, of two year's duration, and the bandsman's course, of one year's duration.

The authorized strength of the student and school detachment is 273, but at present, on account of the decrease in the army and lack of transportation, the total personnel numbers 140. Thus there is a fine chance for young men earnestly desiring to benefit themselves in this profession to fill these vacancies and get a first class musical education. Candidates may enlist for the school or request their transfer from any organization or branch of the service.

The subjects taught are instrumental instruction on all band instruments; the theory of music; ear training; solfeggio; melodic and harmonic dictation; arranging and transcription; conducting; pedagogy; history of music; and band administration and control.

The advanced classes are also required to attend certain musical performances in the City of Washington, such as concerts and operas, as part of their education.

The school has an excellent musical equipment, including an acoustic laboratory, musical library, all instruments used in army bands, and the more important orchestra instruments, including pianos and organs. Each student is furnished a first-class instrument of the kind he selects, and the bandleader students must master all the common band instruments.

Former members of the school include Ralph H. Leopold, brother-in-law to former Secretary of War Baker; Percy Grainger, the Australian pianist, and A. M. Small, leading trumpet soloist of New York City, formerly of the Russian Symphony Orchestra of New York.

The School personnel has furnished bands or orchestras on many notable occasions playing before distinguished audiences, including the President of the United States. Practically every capable musician in the school was a member of the band which escorted the "unknown warrior" to his final resting place on the 11th of last November.

A REAL OPPORTUNITY

When one considers how much it costs for musical education nowadays, and how generous Uncle Sam is to this particular school, with its fine buildings, excellent location and valuable equipment, costing

many thousands of dollars, there is an opportunity at hand for the young fellow who hasn't money to pay for a musical course, but who, nevertheless, wishes to devote himself to this most inspiring of professions.

It is no secret that the General of the Armies of the United States is a keen critic of music, and fully appreciates its value in military life. General Pershing demands musical excellence in his bands, and it is the purpose of The Army Music School to deliver the men who can produce this kind of music and build up organizations second to none.

Notes on Water Work in Submarine Mining

By Lt. Col. John M. Dunn, C. A. C.

WORK on the water in submarine mining is so dependent upon local weather conditions of that particular day's operations, that it appears to the writer to be almost useless to attempt to state any rules that should govern in all cases. At the same time, many officers have slightly different ways of accomplishing the same results, and again, masters and ships officers differ in the systems used in handling the vessels when at work in the mine field.

There are, however, certain things that concern all alike and it is the purpose of the writer to attempt to explain what have seemed to him to be the quickest and easiest ways of solving these difficulties as they present themselves.

Throughout this entire paper the idea must be borne in mind that these remarks refer particularly to the daily drill of planting practice groups of seven mines, using such of the old material as may be on hand and making the best of, and due allowances for, old and imperfect cable. If we can obtain reasonably good and satisfactory results from this somewhat worn material together with the necessary experience and training of the personnel when working in small boats or on the deck of the larger planting vessels, then it is safe to assume that we are maintaining a standard sufficiently high to insure the results that justify the system, its existence and our methods of work.

This article deals particularly with water work and such shore training as may be absolutely incident to it, avoiding as far as possible all reference to the general routine instruction of the shore elements of the system.

It is more than important that all soldiers assigned to a mine company should be able to swim and to this end should be regularly drilled, practiced and qualified in this athletic exercise. The results obtained from such training will instill such a confidence in the various crews when on the water as to justify any additional time that may be spent in this instruction. There are conditions of wind, weather and emergency to be met in the mine field that at times make the water work dangerous to men who are unable to swim. I believe that every man should not only be required to qualify at swimming in a bathing suit, but also dressed in the blue denim uniform with shoes, just as he would be if overboard in the mine field.

PREPARATION FOR VISIT OF PLANTER

From two to three weeks before the arrival of a planter at a post, mine commanders should have daily drill in the following details:

For D. B. Boat, Yawl Boats and Planter Details

1. Taking soundings.
2. Throwing heaving lines.
3. Use of boat telephone in getting communication with mining casemate, making air and tag test.
4. Yawl boat drill, coming alongside of large boats and wharf, picking up keg and mine buoys, use of boat hooks, etc., special attention being given to the commands of the coxswain.
5. Tieing *rapidly* the following knots; sheet bend, square knot, bowline, clove hitch, cats-paw and stopper.

For Cable and Loading Details

1. Chief Loaders, Chief Planters and all sergeants should know how to make the voltmeter test of cables, mines and transformers.
2. If necessary to lay cable, the cable book should be consulted and the proper number of reels of multiple cable picked out and located in the tank.
3. Sounding lines about 8 fathoms long should be prepared, well soaked in water and graduated.
4. Heaving lines 80 feet long should be cut, prepared and soaked in water.
5. At least seven keg bouys should be tested in loading room tank and fitted with new strong bridles.
6. Mine buoys should be prepared and painted.
7. The necessary material for one group of seven mines should be cleaned, have all tallow mixture removed and be in readiness for assembling. Paint should be scraped off all keys, pins, etc., of such shackles and junction and distribution-boxes as will be needed and all parts made to fit.
8. Mine transformers should be tested and laid aside for assembling in the group.
9. The contents of all tool-boxes to be used should be overhauled and made ready for use.

Mining Casemate Detail

1. Boat telephones should be tested and put in proper working order if necessary.

EFFECTS OF WIND, TIDE AND CURRENT

In mine field water work the effect of the wind is in general a small factor and ordinarily it can be treated as a negligible quantity. It

may happen that the wind has sufficient velocity and is blowing from a point against tide which will make up a sea sufficiently rough to interfere with the work of the yawl boats or the D. B. boat. Such a condition may make the work exceedingly dangerous for the small boats if it does not actually prevent their remaining in the field. This is a factor that the officer in charge of the water work should bear in mind.

Currents are more likely to be manifest in river areas than in harbors and are more or less increased or diminished with the run of the tide at the particular time. Cross currents are encountered in some localities in the mine field at times that upset all calculations and of course render the handling of the planting vessel more difficult. Local conditions should be carefully studied. This will eliminate many delays and annoyances.

The tide is an entirely different factor. No matter at what time a vessel may go into the mine field for work it is an important question to be considered. There is a general belief among those who have had but little experience on the water that the importance attached to the tide by all seafaring men, is an idiosyncrasy of the life and a very much overrated force. Such however is not the case and but a short stay on any vessel should convince the most skeptical.

The opinion of all the different masters of mine planters who have operated on the Atlantic Coast is one and the same, that it is practically impossible to lay mines except when the bow of the planter is working into the tide. In fact this holds good for any mine field work either planting or raising. It is not that the mines cannot be dropped at any time, but that the running close by and passing the D. B. boat, and the paying out of a cable astern must be done against the tide or else the planter will be swept down upon the small boat and foul it, resulting in the loss of the distribution-box and multiple cable, if not in permanent injury to the boat and loss of life.

The type of mine-buoy in general use is a piece of 6″×6″ timber about 24″ long, with a small hole bored in it through which to pass the mine buoy rope. In many localities this is a thoroughly satisfactory piece of equipment, but on the other hand there are water areas where the force of the tide and current is so strong as to carry this buoy under the water, where it remains submerged at all times except during and perhaps just before and after the slack water at the turn of the tide. Such conditions are known by mine commanders and much valuable information may be had in experimenting with various forms of buoys with a view of determining the most suitable type for use in the locality. During the annual visit of the planter these types should be further tested under actual planting conditions. It sometimes happens that keg buoys are carried under by the tide. This difficulty may be overcome by fastening a second keg buoy to the first one. The first one may go under but the second one will float.

LAYING AND RAISING MULTIPLE CABLE

After having decided upon and after having located on a chart the proposed position of the distribution box for the group, probably one of the most important, if not actually the most important, features of mine work on the water is that of getting the multiple cable laid to that point without kinks. A kink may or may not injure a cable, but it is undoubtedly true that it weakens the insulation at that point and increases the possibilities of a break down. In a large measure the success of this work depends upon the handling of the vessel by the master.

The planter should first go into the mine field and mark the approximate position of the distribution-box by dropping a keg buoy. This can readily be done by means of signals from the shore.

The reels of cable should be taken on deck and placed in the cable jacks. If more than two reels, the extra ones are carried on deck and shifted to the jacks as the other reels become empty. Care should be taken to see that the reels are placed in the jacks so that in playing out they will run over.

The end of the cable is rove through the cable laying block at the bow and a raising rope is made fast to the end of it. As the planter passes the boat having the junction-box, the end of the rope is passed to the small boat and the cable hauled in. The planter now proceeds to steam ahead in the direction that the cable is to be laid. Too much speed would play out the cable too fast and too little speed would result in the cable not having enough tension and consequently falling to the bottom in loops which may subsequently become kinks if any tension be applied.

When there is still about half of the last layer on the drum preparation should be made to let go the ship's anchor. This is done at the last moment for it must be remembered that the ship will drop back some little distance, depending upon the length of anchor chain it is necessary to play out to hold the vessel. The end of the cable is then taken out of the block to permit of its being shifted to receive the end of the next cable. After this new end has been rove through it is carried around the bow, the ends of both cables fitted in a junction-box and the joints made.

It is a very wise precaution at this point to open communication with the mining casemate by means of a telephone on board. An air test made, will determine the condition of the cable up to this point. When all is ready to proceed the anchor is raised and the second reel played out.

If this be the end of the cable an anchor is rigged on the anchor davit and the raising rope carried forward clear of everything to the bow. A keg buoy is placed on the rail between the anchor and mine davits and its raising rope also carried forward to the bow. About

twenty feet back from the end of the keg buoy raising rope, take a bight of the rope and by means of a double sheet bend make fast the end of the raising rope going to the anchor.

A man standing in the bow with the free end of the keg buoy raising rope makes a loose clove hitch around the cable beyond the cable laying block. When there are about three turns remaining on the drum, the brake is applied, the clove hitch tightened on the cable, the staples fastening the cable to the reel are removed with a crowbar and the end is let go overboard. At the same time the anchor is tripped and the buoy is thrown overboard.

The anchor serves to hold the end of the cable at the designated position preventing the tide from sweeping it back. Just as soon as the buoy is picked up by the D. B. boat the raising rope is hauled up until the sheet bend is had. The anchor rope is then made fast to the niggerhead at the bow and the cable hauled up and into the boat by the other rope. It may so happen that this anchor will have been placed so as to serve as the anchor for the D. B. boat, otherwise another anchor must be laid and the first one taken up, it having served its purpose. The D. B. boat should always be in the immediate vicinity of the planter when laying cable to recover the end of the cable as quickly as possible.

The assumption in the foregoing has been that the tide is running against the planter. Cable can also be laid, with the tide, using practically the same system of work. Both ways have some advantages although working against the tide is the more practical and successful. Against the tide the vessel handles much more readily. With the tide steerage way is more or less interfered with but there is no danger of the vessel working back at any time, in fact the greatest draw-back is that the tension on the cable may become too great.

In laying more than one reel of the Class B cable, each having perhaps two or more bad conductors, a little forethought may save considerable trouble when out on the water. Before the reels are removed from the tank, the cable-book should be consulted and the numbers of the bad conductors in each reel determined. These bad conductors should be marked at each end of the cable in some way so that they may be known. When the joints are made in the junction-box the bad conductors in each reel should be connected together, and likewise the good conductors. By neglecting this precaution, for example, in a case where there were three bad conductors in each reel, the number of good cores testing out at the D. B. boat might be one instead of four assuming two reels to be laid. After the reels are taken on the planter, a piece cut off, and turks head worked it is generally too late to find out such information, particularly if the planter has laid the first reel and is at anchor in the stream. Of course a test back to the casemate will always develop conditions as far as you have gone but the difficulty would be in determining the condition of the cable not yet laid.

Cable is taken up in the reverse order from that in which it is laid. The only precaution necessary is to reel it as carefully on the drum as possible laying on all the turns evenly and having enough of the end exposed on the outside of the drum for testing purposes in the tank. This reeling up of the cable is easily accomplished except where kinks occur. These destroy the regularity of the turns and make it impossible to get a perfectly reeled cable. Such cable should be unreeled again on shore, the kinks removed if it is thought it can be done without destroying the insulation and again reeled up before placing in the tank.

LAYING OUT THE MINE FIELD

The following equipment should be taken on the planter for laying out the mine field and is in addition to the list of equipment that is always taken on the planter.

1 Measuring Line and Frame.
4 Anchors Either 1000 lb. or 500 lb.
4 Keg Buoys.
4 Raising Ropes (Hemp if on hand.) The length of the raising rope should be the depth of the water plus about 75 feet.

The marks on the measuring line should be painted and at least four feet long. Small marks are of no use whatever as it is almost impossible to see them with the planter running at anything like the speed necessary to hold its headway in the tide.

The following is suggested as a good system of markings for the measuring line:—

100 ft. Black.
200 ft. Black.
280 ft. Black and Red.
300 ft. Red.
350 ft. Red.
400 ft. Black.
500 ft. Black.
580 ft. Black and red.
600 ft. Red.
700 ft. Black.
800 ft. Black.
880 ft. Black and Red.
900 ft. Red.

By using this system, the *Black and Red* are the warning marks and the *Red* marks, the ones at which a buoy is dropped.

An important feature in laying out the mine field, is the side of the planter from which the buoys that mark the positions of No. 7 and 13 should be dropped. Under such conditions the planter is running across the tide and care should be taken to see that as the planter makes the run by the yawl boat the tide runs from the direction of the yawl boat to the planter. This will prevent the planter from being swept down afoul of the yawl boat and will avoid the consequent accidents that might occur.

The crews of the D. B. boat and yawl boats should be instructed to make the end of the measuring line fast to a cleat with half a turn as

quickly as possible after the end is received and to cast the same off at the signal of one short blast from the whistle of the planter.

The measuring line frame is lashed to the deck of the planter near the mast, care being taken to see that the line will run over on the drum in playing out. Three privates are assigned to this piece of material, one to operate the brake, and the other two the handles.

The end of the measuring line is carried forward, rove through the bow chock and brought back to the heaving line man amidships. It may either run outside or inside of the davits. As the planter passes the D. B. boat or yawl boats the heaving line man with the coil of measuring line makes the cast to the boat. The Chief Planter stands near the anchor davit and calls off the marks as they go by. The officer in charge gives the command to trip the anchor at the proper time. After the whistle has blown the measuring line is hauled in hand over hand and reeled upon the drum. While No. 10 is usually dropped from the port side. Nos. 7 and 13 may be dropped from either side depending upon the state of the tide and which side of the yawl boat the planter passes. Conversation held with the master of the planting vessel before going into the mine field will clear up this point. The Chief Planter should be instructed before loading as to which side of the planter the anchors are to be placed in order to avoid subsequent shifting of anchors across the deck.

Yawl boats should take up all slack of the raising rope, coil and secure the same under the keg buoy, leaving just enough slack to float the buoy at high water.

WORK ON THE PLANTER

The first preparation for work in the mine field should be that of a list of all material and equipment to be taken on board the planter. Experience has demonstrated that the lack of sufficient material or tools may cause annoying delays in the prosecution of the work and that it is best to have just what is needed with a few spare pieces for cases of emergency.

The following lists as given have proved satisfactory on all occasions:—

It would be well to remark here that all bolts, nuts, threads, tools, etc., should be carefully cleaned, inspected and be in perfect working order before taken on board, the Chief Planter being held responsible for this.

It is the duty of the Chief Loader to prepare good and perfectly tested mines and to deliver the same to the Chief Planter who should assure himself that such is the case. The condition of single conductor cables should likewise be verified by a simple voltmeter rest. For this test the cables are immersed in the loading room tank so that they are completely under water up to and above the turks head.

When all is in readiness the planter proceeds to the mine field and the operation of planting the group begins. I believe it to be unnecessary to go into the details of rigging and planting the mines, as that is undoubtedly sufficiently well known, the same system being used throughout the mine planting service. It is however well to remember that before the actual planting work begins, all equipment on the planter to be used should be thoroughly tested to see that it is in proper working order, especially the tripping hooks. At times the salt water will rust these hooks over night and may prevent them from operating.

The cable details on the side are for the purpose of handling the cable along the rail and assist in preventing a bight from the side getting into the propeller after the end has been passed to the D. B. boat and before the cable begins to play out astern. These details should hold the cable just a little taut.

A non-commissioned officer or private should be stationed on the upper deck aft whose duty it is to call "all gone" when the cable is all played out and "all clear" when the planter has passed the mine buoy after the mine has been dropped. The words "all clear" should be repeated to the master.

In order to trace to an individual man and place the responsibility of a poor okonite joint, the non-commissioned officers in charge of both port and starboard details on the planter and the non-commisioned officer in charge of the D. B. boat should make a record of the names of the men who are making the joints in their respective details. The condition of the mines and of the single and multiple cable is known from previous tests made. By a simple process of elimination, any defects in joints that are manifest after the group is planted and the box overboard can be traced and the particular man making the joint shown his error. With the box in the D. B. boat a test made at the time the mine is planted becomes practically a test of the joint made on the planter. After the box is in the water a second test is practically a test of the joint made in the distribution-box boat.

WORK OF THE DISTRIBUTION-BOX BOAT

The position of this boat in the mine field and the duties required by its personnel in all mine field work constitute it the point around which all operations center and so far as the work on the water is concerned its efficiency to a large degree determines the success or non-success of the planting of the group.

Separated probably from the officer in immediate charge of the water work (who may be on the planter or in a launch in the field) the instruction of its personnel must previously have been carried to a degree of perfection that will insure a complete understanding between the officer or non-commissioned officer in charge regarding what tests are to be made or emergencies met in the course of the work.

Similarly a complete understanding should exist between the boat and the mining casemate on shore to insure that communication over the multiple cable may be entered into as soon as possible after the box has been raised, and that it may be maintained and continued without interruption regardless of tests made or of poor conductors in cables such as may be expected in the old Class B seven conductor cable used for drill purposes.

The equipment of the D. B. boat should be as follows:—

1 Megaphone.
1 Distribution-box complete (extra.)
Junction-boxes if to be used.
3 Heaving Lines.
1 Raising Rope.
1 Sounding Line.
1 Life Buoy.
1 Life preserver for each man.
Supply of matches, marline and lashing.
Turks head collars large and small.
Brass tags and stamping outfit.
1 Boat Telephone.
1 Earth Plate.
1 Sharp Axe.
1 Boat Hook.
1 Red Signal Flag.
1 Note book and pencil.
1 Hacksaw and good blade.
1 Tool Box complete.
Can of alcohol, tape, brass jointers and waste.

In addition to the above no D. B. boat should ever leave the dock without the following supplies and equipment:—

Sufficient supply of gasoline (Tank holds about 50 gallons.)
1 Flag Ensign.
1 Flag Jack.
4 Brass Lights. (Running and anchor lights 2 white, 1 red, 1 green.)
Supply of oil for the lights.
Matches.
Supply of lubricating oil for engine.
2 Anchors with rope.
1 Beaker of water.
1 Small tin of hard bread. (If the length of the journey warrants.)
1 Set Coston Signals.
1 Compass, Boat.

All of the above equipment is either supplied from the Submarine

Mine property or else furnished by the Quartermasters Department with the exception of the last two articles, i. e., the Set of Coston Signals and Boat Compass. Both are necessary, particularly the compass. These boats in some districts are called upon at times to make long journeys over water areas that are practically open seas. They are subjected to the dangers and difficulties of navigation, and should be equipped with the compass. The coston signals are for use in case of accident or if in distress.

A very good crew for a D. B. boat consists of one non-commissioned officer and seven privates. This includes the regular crew of three men as authorized in G. O. No. 235 W. D. 1909. The additional five men to be detailed, are, one at the boat telephone, two making okonite joints and two handling cables and heaving lines.

All the remarks which will follow under the heading of *Yawl Boats* relative to instruction in casting heaving lines, tieing knots and in handling the boat in making landings, picking up keg buoys etc., are applicable in every sense to the distribution box-boats and should be followed.

For mine field work the D. B. boat should precede the planter into the mine field a sufficient length of time to raise the distribution-box and get everything in readiness before the arrival of the planter. When the box is up and the boat is ready to begin work some signal from the boat assists materially in shortening delays in the field and to this end the writer has made it a custom to use a red flag about 3′ ×2′ bent to a jack staff and hoisted to the top of the mast leaving it there during the working operations. This signal should be resorted to when after any cessation of work for any one of the various causes, the operations are to begin again. It frequently happens that before the planting of the group for some cause or other, more often from lack of attention in the casemate, communication over the multiple cable is interrupted, therefore another flag should be provided of the same size but to be half red and half white. When this is hoisted it is understood to mean that the D. B. boat is ready for work but communication to the casemate is interrupted. It will be found that in following even so simple a system as this that a very complete understanding may be established between the planter and the D. B. boat though they be separated by quite some distance of water.

With the crane lying flat on the deck and the raising rope to the box rove thru the block, hoist away on the box until it is at the top of the water and make fast the raising rope to a belaying pin at the saddle on the mast. Hoist away on the fall of the tackle for the crane until the crane is at an angle of about 70° with the mast. This operation will tend to place the box just over the position where it should rest on the table in the after end of the boat. Slack away on the raising rope lowering the box onto the working table.

To secure the box to the boat take a piece of about 3″ rope five or six feet long. At the middle point of this rope make a stopper around the multiple cable. Bridle the ends one to each bit on the quarters of the boat in such a way that the cable will lead out board directly over the central point of the stern. It is important that this be done in this way for having made the boat anchor fast to the "Nigger-head" in the bow and the cable fast astern in such a manner, the boat should assume a position fore and aft in the tide.

The box should be opened and the ends of the cores of the multiple cable bared for the *Air Test.* In the absence of any given name the writer has found it convenient to so designate that test which consists of drying all the ends of the cable, holding them in the air while the casemate electrician with the milli-ammeter tests in turn each core. In mine field work it is well to make this test a daily feature of the drill and instruction, and the results should be recorded without fail. There is no telling what may have happened to the cable since the last planting. Passing vessels sometimes drag their anchors over the cable with consequent damage if not actually parting the cable. The perfect reading of this test should give zero on each core. However an open core will also give a zero reading, provided there is no ground on the board. In the event that it be suspected that any cores are open, transfer the telephone in the casemate and boat to that line, when it can easily be determined whether or not such is the case. Another rough method is to touch the core of the cable and find out whether or not it is alive and current flowing.

Such open cores should be designated as "Open" in contradistinction to good cores giving zero readings. In making the regular *air test* care should be taken to see that the ends are clear and not grounded to any part of the boat. A half minute should be sufficient time in which to test a single core and 3½ minutes for the complete test.

The casemate is notified "Get ready for the air test. Telephone will be taken off for 3½ minutes, Ready." Remove the telephone, wait the allotted time, then connect the telephone again on the same core as before, and call for results.

The other test necessary to be made in the D. B. boat is the *Tag Test.* This is the test made to tag the ends of the cable in the boat in the same manner that they are connected in the casemate. The casemate is notified "Get ready for the tag test." At the command NOW ground the core to the armor of the cable. The falling of the corresponding drop in the casemate will indicate the number. The core is tagged accordingly. Proceed in this manner until all remaining cores are tagged. With a perfect multiple cable this tag test is a very simple matter but with some of the old Class B cable used for drill purposes there may be three or four conductors testing bad. When one core is grounded two or more drops may fall. In such a case direct the casemate to transfer their telephone to one of the untagged numbered blocks.

Then proceed to transfer the boat telephone in turn to each of the untagged cores until communication is established and tag the core accordingly. Proceed in this manner until all remaining cores are tagged. When however the telephone in the casemate, is for any purpose, to be transferred to another core, the casemate electrician should be directed to remain on the new core for two minutes and then go back to original core unless communication is established. It is apparent that this proviso will insure communication once again in the event that the test failed, otherwise communication might be lost through the shifting of both telephones and the failure of both to get on the same line at the same time.

When the planter is at work planting the group the deckhand of the regular crew of three men should have a boat hook in readiness to assist in receiving the heaving line thrown from the planter. One member of the crew should be stationed near the bow with a sharp axe and another aft with a sharp axe or knife. Accidents sometimes happen, the single conductor cable fouling some object on the planter or else the multiple cable may be fouled by the propeller guard of the planter which projects on the side of the planter's stern under the water. In the event of such emergencies involving possibly the overturning of the D. B. boat it is the duty of the men stationed as above to cut the boat loose from its anchor and the multiple cable. It is well to impress upon the minds of all the crew the necessity of constant vigilance in these matters. The emergency will be unexpected and without warning.

The end of the heaving line having been received, the cable should be hauled into the boat and the heaving line made fast with half a turn on any convenient cleat until after the mine and anchor have been dropped. The heaving line is then taken off and the turks head clamped in its proper place in the box. The test of the mine should immediately follow with the command to the casemate "Test No. ....." Many delays and annoyances are sometimes caused by failure to promptly make this test. As the planter passes the D. B. boat to plant the next mine, the test of the preceding mine planted should be called out to the officer in charge. When all mines have been planted, the joints made and the box closed, it should be lowered into the water by reversing the method of raising it. Whether or not there are single conductor cables connected to the box it should always be lowered into the water and never pushed overboard. A box pushed overboard with the cables attached will frequently turn over in going to the bottom. This creates tangles in cables, confusion and difficulties when the group is taken up.

The D. B. boat has two raising ropes to handle and fasten to the keg buoy, one leading to the box and the other to the anchor. Make the end of the rope leading to the anchor fast in the harness of the buoy with a bowline, and make the end of the rope to the box fast in the bight

of the first bowline with another bowline. This should prevent confusion and doubt as to which rope leads to the box. Another way is to paint with red lead the end of the rope leading to the box and hoist on the red rope to raise the box.

Inasmuch as the D. B. boat precedes the planter into the mine field, it may sometimes be necessary to recall it without the planter leaving the dock. In such cases when the field is so located where the dock and planter can be seen hoist the "International Signal Flag" N on the planter (blue and white squares,) which will be understood to read "D. B. boat return to dock." The answering or acknowledging signal that it has been customary to use in the mine field is that of raising the right arm full length over the head, and is taken to mean that the order or message given has been received and is understood.

YAWL BOATS

The yawl boats go into the mine field primarily for five purposes.

1. To hold up an oar for the purpose of permitting the base line to plot the location of the mines planted.
2. To take the submergence of the mine.
3. To make soundings along the line of mines, or the proposed line of mines.
4. To assist the planter in planting and raising mines, laying out the mine field, raising keg buoys, underrunning cables and to be generally useful.
5. To remove mine buoys from the mines when so directed.

The crew of the yawl boat should be carefully chosen and drilled in the small boat drill. I believe that this should be as much a feature of the daily Artillery drill of the post as that of gun drill at the batteries. They should be carefully instructed in cordage in the tying of a few simple knots, such as a bowline, square knot, cats-paw, clove hitch, a stopper and single sheet bend, and should not only be able to make these knots, but make them with the greatest possible speed, the men being practiced until this speed can be attained. A liberal allowance of time for making the knots with a 3″ hemp rope is not over seven (7) seconds for any one of the knots. The reason for such rapidity is that it is rarely necessary, and particularly so in the yawl boats, to make a knot unless something is happening. It is possible in the swiftest tides and currents of our coasts to bring the planter alongside a yawl boat with safety and pass them a line to make fast to any object, but it is impossible to hold the planter in that position in the tide more than a few seconds of time before it is swept away from the small boat. Naturally, the planter must approach the boat against the tide to avoid accident.

The engines are stopped a reasonable distance from the boat so what little headway the planter may have is soon overcome by the tide and

current. In this interval of time, which I have found from experience to be about 10 seconds the end of the rope must be received and the knot made. With men seated in a yawl boat the man who is to receive the end of the rope can not be designated as it may fall near any one, so all should be equally well instructed. The bow oarsman should always have the boat hook ready to receive any rope cast.

As it is frequently necessary for a heaving line to be thrown from a yawl boat, at least one man should have had training in this respect and should be able to straighten out the usual 80 ft. heaving line.

Keg buoys should be planted in near by waters and the boats drilled in approaching and picking them up. The easiest way of course to approach a keg buoy is to float down on it with the tide and it is almost impossible to pick it up under such conditions, as the raising rope to the anchor is probably stretched to its full length and taut. The proper way is to approach the buoy rowing against the tide. As the boat nears the buoy the coxswain should give the command "In bow." The bow oarsman ships his oar and takes the boat-hook. When almost up to the buoy the bow-oarsman commands "Way enough. Hold water." This should give him just enough headway to get a little slack in the buoy rope and the keg can very easily be lifted in over the bow. If the tide be running very strong the bow-oarsman should endeavor to hook the keg and while holding it at the bow allow the boat to be rowed ahead far enough to get sufficient slack in the buoy rope before giving the command to hold water.

The same rules of approaching against the tide apply to making landings alongside docks or other boats, and a well instructed crew must have practice in these things. A non-commissioned officer in charge of a yawl boat crew should be thoroughly acquainted with general tide conditions in the harbor and to this end must have received such instruction during the indoor season. Before going into the mine field each coxswain should obtain data as to the state of the tide for the day together with the hours of high and low water.

The boat call for yawl boats that has been customary to use in the mine planting service is four (4) short blasts from the whistle of the planter. Upon the signal being given the nearest available yawl boat will go alongside the planter.

As a general proposition when actually at work on the water there are but few places where six oarsmen are not needed. I consider that the crew should be of that number and it is more or less useless to go into the mine field with a less number, expecting the boats to move around in the field with any thing like the quickness desired.

The following is a list of equipment that should be taken into the mine field by each yawl boat.

7 Oars.
1 Boat Hook.

1 Life Preserver for each man.
1 Bail.
1 Life Buoy.
1 Heaving Line.
1 Megaphone.
1 Raising Rope.
1 Sounding Line.
Supply of lashings.
Plenty of marline.
1 Note book and Pencil.

It is generally customary to send the D. B. boat and yawl boats into the mine field ahead of the planter, and the position of the yawl boats upon the arrival of the planter seems to be an important matter. As a general proposition, they will be found tied up to the D. B. boat and with ample opportunity to see the approaching planter, appear totally unconcious of its arrival or that it is up to them to move to some other position of the field and that the work of planting the group is to begin at once.

It is more than likely that immediately upon its arrival in the mine field the planter will make the run by the D. B. boat to plant the first mine No. 10 from the port side. Now, if the field has previously been laid out, the yawl boats should clear away from either the D. B. boat or particularly the keg buoy at the location of No. 10 and take a position on the water at about the place where No. 9 mine will subsequently be planted. In any event they should keep to the left of the line between the D. B. boat and the No. 10 buoy, or else they will stand in danger of either being run down by the planter or delaying the beginning of the planting. Any delay made necessary at this time causes the planter to loose its position in the ride for the run by and a consequent manoeuver to regain the same. Should it be the intention to lay the group without first having marked out the field, then it is almost an absolute certainty that No. 10 mine will be laid directly into the tide and that the line of mines will be perpendiculer to the direction of tha tide. A yawl boat coxswain should be able to judge the probable location of No. 10 and apply the foregoing principles in either case.

After the first mine has been dropped, all yawl boats will tie up one to the other at No. 10 mine. The next mine planted is No. 9. As the planter approaches to drop this mine the last boat should cast loose and pick up the mine buoy as soon as the planter is clear. In a similar way when No. 11 mine is dropped the No. 2 boat picks up that buoy. Thereafter during the planting while the first yawl boat remains on No. 10 mine, the others work outward each on its own flank. In the event of but two boats in the field the first boat would move outward on the right flank and the second boat outward on the left flank.

In taking the submergence of mines the mine buoy rope should be pulled up taut at the bow and the submergence taken to the water-level, care being exercised to note and record the time, as reduction to mean low water is dependent upon this factor. In case the buoy rope is tangled in the mine or goes under, the submergence can be taken either with an oar or with the sounding line.

To pick up a keg buoy and its anchor on the planter, the yawl boats assist by first picking up the buoy and taking it inboard.

On the raising rope about eight feet below the buoy make a bight in the rope. The planter comes alongside and passes the end of a raising rope to the yawl boat. Pass this through the bight mentioned above making a sheet bend, and throw the buoy overboard out of the yawl boat. When the rope is hauled in on the planter the sheet bend will pass over the sheave of the cat-head and the keg-buoy can be lifted on deck. The end of the raising rope is then unfastened from the harness, led through a block to the steam or electric winch and the anchor is raised. Under no circumstances should the end of the rope from the planter be made fast in the harness of the buoy.

Before going into the field the non-commissioned officer in charge should assure himself by inspection that all of his prescribed equipment is on hand. It is especially important that the painter should at all times be neatly coiled in the bow. This is done by the bow oarsman immediately casting off from any mooring, and before he resumes his oar. It will be needed again and needed quickly and it should be ready for instant use.

To recall the yawl boats from the mine field in the same manner in which the D. B. boat is recalled hoist on the planter the International Signal Code flag "R."

For the benefit of those who have yawl boats in their charge the following list of material for preservation and care is given.

This is a liberal allowance for the year per boat and may be somewhat larger than the amount authorized by the Quartermasters Department, with which the writer is not familiar. This list is simply given as a guide.

3 gallons, Paint lead or white color "Outside" best	$4.50
2 lbs. Paint black in oil	.40
1 gallon, Turpentine	.50
2 quarts, Paint Aluminum	1.40
24 sheets, Sand paper, Nos. 2 and 3	.25
5 lbs. Soap, common	.25
10 lbs., Soap powder	.50
2 Brushes, scrubbing	.25
60 ft. Rope, Manila, 3-inch	1.50
5 lbs. Waste Cotton	.40
Total	$9.65

In addition to the above the following should be furnished once a year:

1 Bucket, G. I.	$0.30
1 Scraper Cabinet	.35
1 Scraper, Three Cornered	.35
Total	$1.00

REPORT OF PLANTING

In order to insure that the various details engaged in mine planting operations make and record the prescribed tests, etc., the writer has originated the report shown at the end of this article. After the group has been planted all details turn their data in to the company office. This is recorded on the blank and submitted to the Commanding Officer of the planter the following morning for criticism or approval, after which the report is returned to the company.

.....Group

Report of a Group Planted.....192

Mine No.	Time of Planting	Casemate test of Multiple Cable	D. B. Boat test of Multiple Cable	Test of Mine	Test with box in water	Test after two hours	Depth of water at Mine	Submergence	Plot of the Group. 1-in. equal 100 yds.
10									
9									
11									
8									
12									
7									
13									

Deviations and Errors

By Captain Donald B. Greenwood, C. A. C.

SINCE the close of the war numerous articles have been written on the subject of spotting systems for moving targets. The general principle of these has been to locate the position of splash, and refer it to the actual or expected position of the target at the same instant. One or more spotting stations are located to the right or left of the battery target line, an observing instrument is used to follow the target until the splash occurs, the angular deviation is obtained, and is converted into yards over or short by some kind of a spotting board or chart.

This works very well when used against fixed targets, and has, at times, given very satisfactory results when used against moving ones; but in the latter case there is always a possibility of two factors entering into the practice which will retard the progress of the adjustment, and which can not be eliminated by any system of spotting based on the position of the target at the instant of splash.

The first of these is the possibility of the target changing speed or direction during the observing interval, and consequently being some distance from the set forward point, through no fault of the position finding system. We assume that the target has arrived at the set forward point at which the gun was aimed, at the end of the time of flight. Should the target actually be 50 yards nearer the battery at that instant, the deviation reported will be inaccurate to that extent; and the resulting error cannot be corrected by adjusting the range.

The second possibility is the personal error. Let us assume that a battery is firing at a moving target. The true range of a set forward point is 8,000 yards. At the end of the time of flight the target arrives at that point. The plotter obtains the correct range of the set forward point, and calls 8,000. From the range board, the corrected range is found to be 8,300. The Battery Commander has in addition, added an adjustment correction of plus 200 yards from previous shots. The proper setting of the range scale then, is 8,500. Private Ducrot however, gets it as 8,900, no one catches the error, and the range scale is set at 8,900. The shot falls 8,300 yards from the battery. The spotting section reports it as 300 over, and the battery commander accordingly makes a correction which throws his next shot short. He blames it on the powder, and is compelled to fire three or four extra shots to get his battery adjusted. When it is all over, and an analysis is made, he discovers that Private Ducrot has "gummed the game," and that, had

the range scale been properly set, the splash instead of being 300 yards over, would have been 100 yards short.

If the target continues on the same course, at the same speed, or if not, if the plotter is expert or lucky enough to predict the proper set forward point, well and good. But suppose he doesn't? A well trained battery should operate without errors: but nevertheless, some errors are usually made; and there is no system of fire adjustment which has yet been devised which will correct for personnel errors, and which will not be thrown out if they are introduced.

To obtain satisfactory results then, the battery commander must be furnished with armament errors; not deviations. This can be done by forgetting the position of the target, and basing the data on the set forward point the gun was *actually* aimed at, instead of the one it should have been aimed at. By taking the actual setting of the range drum, stripping it of all corrections, and comparing the result with the actual range to the splash; regardless of its azimuth or deviation from the target.

In the illustration mentioned above, the range scale was set at 8,900; the corrections were plus 300 from the range board, and plus 200 for adjustment. Stripping these from the setting of the range scale, we get 8,400. The range to the splash was 8,300. By this method we obtain the deviation which would actually have occurred, had no personnel error been made.

On the other hand, let us assume that no personnel error had been made; and the range drum set correctly at 8,500. The range to the splash would have been 7,900 yards or 400 yards less than it was with the range drum set at 8,900. Stripping the ballistic correction of 300 yards, and the adjustment correction of 200 yards, from the setting of the range drum, we get 8,000, and our deviation is still short 100.

Adjustment and ballistic corrections can be stripped from the setting of the range drum, and the armament error determined by the use of a simple slide rule which is illustrated by Figure 1.

This slide rule can be constructed by the company mechanic from a block of wood 30″×4″×1″. It carries four scales, two of which are arranged on slides. The scale "A" is fixed on the lower part of the slide rule, the graduations being 200 yards to the inch, the least reading ten yards. The readings run from zero at the center of the slide rule, to plus 3,000 on the right, and minus 3,000 on the left. The scale "B" is mounted on a slide. The bottom portion of the scale is graduated from 14,000 on the left, to 8,000 on the right. When set at normal, the 11,000 graduation should be opposite the zero reading on scale "A." An arrow should be marked on the upper portion of the "B" scale, opposite the 11,000 graduation. The scale "C" is mounted on a second slide, the upper and lower portions of which are graduated to give readings 3,000 yards either side of the center. A small piece of celluloid

or similar material should be set into the slide in front of each even thousand yard graduation. This will enable the operator to mark the thousands of yards of range in pencil in the same manner as the operation is performed on the time range board in the battery emplacement; the mark being rubbed out and changed when necessary. The scale "D" is fixed on the upper edge of the slide rule, and graduated in the same manner as the "A" scale, the zero of each scale being in the center of the slide rule.

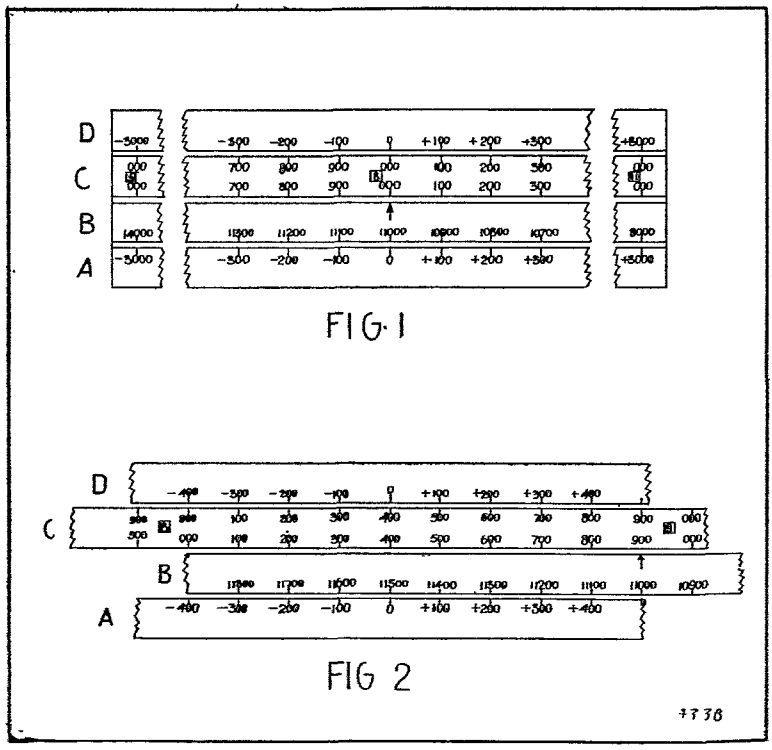


FIG. 1

FIG 2

This rule is used by an operator in the Battery Commander's station. He hears and notes the range corrections ordered by the battery commander. Over the intelligence phone he is informed of the upper scale reading which appears opposite the 11,000 graduation on the lower scale of the Range Board. He slides the "B" scale over until this reading is opposite the graduation of the "A" scale which corresponds to the last range correction ordered. If no range adjustment correction has been ordered, the "B" scale is moved until the desired reading is opposite zero on the"A" scale. This should be done as part of the regular drill, and should be set on the slide rule before the gun is fired.

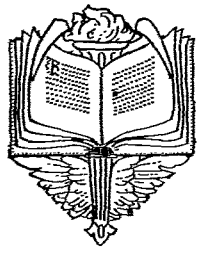
As the gun is fired the range recorder reports over the Battery Com-

mander's phone, the actual setting of the range drum. The scale "C" is moved until this range is opposite the arrow on scale "B." This should be done before the splash occurs. A spotter equipped with an oriented azimuth instrument should be stationed in each battery observing station. The azimuth of the splash is transmitted to the plotting room over the intelligence phone and by means of a second plotting board, or suitable chart which can easily be constructed, the range from the gun to the splash is determined, and the operator notified. Opposite this range on the upper portion of scale "C," the armament error will be found on scale "D." This information should be obtained ten seconds after the splash.

In the case mentioned above, the ballistic correction was plus 300 yards. The reading of the range board then, would have been 11,300. Scale "B" is moved over until this graduation is opposite the adjustment correction of plus 200 on scale "A" (figure 2). The actual setting of the range drum was 8,900. This graduation on the lower portion of the "C" scale is placed opposite the arrow on scale "B." The actual range of the splash was 8,300. Opposite this figure on the upper portion of the "C" scale, the reading on scale "D" is minus 100, the armament error.

Deflection adjustment offers a simpler problem than that of range. However, the deflection error due to a change in the course of the target can be disregarded in Case II firings; and it being possible to measure deflection deviations accurately with an azimuth instrument at the Directing Point of the Battery, in view of the small probable error of our guns, any large personnel error should be readily detected. This method can, however, be adapted to deflection deviations if desired.

In addition to the elimination of errors, this method of spotting has the advantages of being simple and quick; it requires no additional stations or telephone lines, and no elaborate construction or preparation is necessary.



Radio Communication in the Coast Artillery

By Captain Sanford D. Ashford, Sig. Corps, (C. A. C.)

THE recent articles in the JOURNAL on radio show that this topic-of-the-day is receiving merited attention in the Coast Artillery Corps. Nothing in the history of the country has had such a phenomenal "boom" as radio, in the past few months. The advent of broadcasting speech by radiophone has spread the art in the form of a popular amusement to every corner of the United States and in fact around the world. It is not strange then that radio has assumed a prominent place in our system of communication, a place which will be permanent and of invaluable service in the conduct of future operations.

It is contemplated that radio communication will be used between all combat units down to and including battalions or their equivalent in the various arms of the service. Lack of proper training methods has been the principal drawback to radio thus far. The personnel, mostly ex-commercial operators, did not receive the proper training to handle military traffic, but we are now able to develop operators and electricians from raw material who are capable and efficient men. Facilities for coding and decoding were meagre and not uniform, so that radio messages, which must all be in code, were often unintelligible. This has been overcome by having the Message Center do all the code work.

The situation has changed, everyone has come in contact with radio in some form, and recent developments have proved its worth in every day service. The greatest single element essential to the success of present day radio has been the vacuum tube. It is used to generate radio "waves" (undamped), to "detect" them and to "amplify" them at both radio and audio frequencies.

To be sure radio is not secret and the location of sets can be determined after a fashion by enemy goniometric stations but it is doubtful if this information alone would be sufficient to draw artillery fire. Also, radio stations may interfere with one another.

The advantages of radio communication from a military standpoint are:

(1) Reliability of operation
(2) Ease of maintenance
(3) Facility with which they may be installed and transported.

(4) Communication between rapidly moving units such as aeroplanes, or between plane and ground or where wire communication cannot be maintained.

(5) Transmission is independent of road conditions and for the range for which our sets are designed they are barely affected by weather conditions.

In order that interference between radio sets may be reduced to a minimum, the set at the Headquarters of the tactical unit involved and the sets of each next subordinate units are grouped in a "net." The "Corps Net" includes the corps headquarters station, the division stations and the stations of special corps troops. The same arrangement is applicable to a Coast Defense Command. Each net is assigned a different wavelength which permits several nets to operate simultaneiously. Regulations for net operations come under three classes viz: the controlled net, the directed net and the free net. The latter is seldom used. A control station in each net regulates the traffic and is known as the Net Control Station. It may or may not be the headquarters station.

Radio communication is chiefly used for regular telegraphic work but as most of the new sets are equipped for telephone and buzzer operation it is important that these features be made use of where occasion requires. Commanders should make a careful study of their message traffic with a view to availing themselves of radio service and give the latter its proportionate share of the regular message traffic load. This will boost the morale of the radio men and expedite government business.

For the Coast Artillery, radio communication is ideal and its use unlimited. For communication between forts in the same coast defenses, the radiophone has an enormous advantage over the telephone, which must depend upon submarine cables for its existence, and everyone knows the difficulty of repairing cable with limited personnel is a problem. Other uses for radio are for receiving meteorological data, press reports, time signals and communicating with Railway Artillery units operating with the defenses. Communicating with observation planes, independent batteries and land forces in the vicinity are all possible with facility and minimum delay.

Before this you have wondered where the radio sets are that will give these results and I hasten to add that the SCR 132 and 136 sets spoken of by Captain Matejka in the June issue of the JOURNAL, are to do this work. Until they are turned out and available for issue a lot of good results can be obtained from the sets on hand.

The tactical requirements of the Coast Artillery called for a two way Telegraph-telephone set with a range of about thirty miles, to communicate with corps headquarters and observation planes as well as for coast patrol work. Naturally the set must function with air service

sets and other ground sets so the development progressed with this idea in mind. The air service got a start in this work and hence the sets known as the SCR 132-133-134-135 and 136 all conform to nearly the same specifications except for minor details incident to the use for which they are built. The SCR 132 and SCR 136 are ground transmitting sets having the following general characteristics:

	Type	Phone Range in mi.	Telegraph Range in mi.	Transmit Wave length	Receive Wave length	Description
SCR	132	80–100	200–250	850–1900	550–2200	Ground set for use with observing planes.
SCR	136	30	50–90	350–900	200–1200	Ground Pack set.

Both sets are combination telephone, C. W. telegraph and buzzer modulated transmitting sets employing the constant current system of modulation. The receiving sets will probably be on the superheterodyne principle employing radio and audio frequency amplification.

In conclusion, bear in mind in your research and experimental work that the sets you have and hereafter receive are designed with an idea of maximum efficiency with minimum operating parts to make them as nearly fool-proof as possible. To this end such refinements as filament control and other commercial practices are often omitted. Practically any transmitting set in the service can be forced to radiate more energy and the receiving sets can be made extremely sensitive by using a regenerative circuit, filament control rheostats, commercial detector tubes or wired for a single circuit tuner, but in so doing you have lost some of its reliability for continuous service under all the conditions for which it was designed and in addition an expert operator must be placed on the set who knows how to adjust it for every little change of the incoming signal, etc. Expert operators are, of course much to be desired, and their training in code practice, radio procedure and familiarity with their sets should be given careful attention by the officer concerned, but it will be found that their message traffic will occupy so much of their time that they have no time to spend continuously tuning their sets to avoid interference.

EDITORIAL

Sub-Caliber Practice

IN Major Quinn Gray's paper on "Coast Artillery Training" published in the JOURNAL for May, he states (Page 394):

"Sub-caliber target practice is mainly for training in observing impacts, and in determining and applying corrections. Outside of this the practice is of little value to the range section, and it is of less value to the gun sections."

It is seldom that the Editor has occasion to disagree with professional opinions expressed by Major Gray, but here is such an occasion. It is believed that Major Gray himself would recognize in a difference in individual experience concerning the possibilities of sub-caliber practice, ample justification for the conviction that sub-caliber practice can be more valuable than he believes it to be.

An editorial on this same subject in the JOURNAL for June 1921, written by Major J. C. Haw, sets forth a view of the possibilities of sub-caliber practice which is believed to be justified by experience. No attempt will be made to repeat the observations of the editorial mentioned. Only two additional suggestions will be hazarded. First, in order to get the maximum benefit from sub-caliber practice, the battery commander should draw, borrow or otherwise obtain enough additional sub-caliber tubes so that he will have a tube for every gun which the battery mans and fires. If additional sub-caliber platforms are not available, they have been and can be improvised from scrap lumber. By these means no desirable method of adjustment is barred in sub-caliber firing, the full communication system and personnel may be used and tested, all gun commanders and gun pointers are able to gain practice simultaneously, and the battery's facility in target assignment and identification may be tested as a unit.

In the second place, the program for each sub-caliber practice should be so thought out beforehand that those members of the truck details, ramming details and ammunition section for whom sub-caliber firing provides no duties, should have some other definite and useful assignment, for instance, as substitutes and understudies in the range section. Sub-caliber firing should not be allowed to become an occasion for anyone in the battery to loaf.

Grant that the sub-caliber gun and ammunition are not satisfactory from a ballistic standpoint, and that it is a nuisance to prepare for sub-caliber and to clean out the gun afterward, the fact remains that we have these guns and ammunition, in addition to everything else, so that there is just that much more shooting we are privileged to do. While we are at it, let's make the most of the opportunity, and the opportunity certainly includes more than the training of spotting personnel.

As to Poison Gas

Reprinted for the information of Coast Artillery Readers from "The Military Surgeon" for June, 1922

During the war the introduction of the use of poisonous chemicals as a matter of offense was a clear breach of faith by the Germans, who had, not once, but twice voted against their use through their representatives at the conferences at the Hague.

Their horrible efficiency gave an added complex to modern conflict, an influence which will probably linger and again become effective in future warfare. In the present interim of comparative peace we are not particularly concerned with them as a war measure. They have, however, come to bother us from an economic standpoint and in a manner which affects the individual taxpayer.

Any investigation of claims for compensation by former soldiers will show a steadily mounting ratio of men who base their disability on the fact that they were gassed while in France. This has gone to such an extent that the official figure in the records of the Surgeon General of the Army for this class of casualty is only a fraction of the number who claim compensation for disability attributed to this cause. While there is a divided opinion as to whether the fact of having been gassed can be the cause of a subsequent disease, notably tuberculosis, the large majority of medical men, and those who have had the most experience with gas cases, is distinctly in opposition to the theory. It may, of course, be quite frankly admitted that there is a possibility, not a *probability*, that a lung irritant might favor the activation of any dormant process. That it could, *per se*, induce it seems quite irrational and illogical if we accept the essential theory of germ disease, "*omne vivum ex vivo.*" Nor does it seem probable that after a comparatively long period, during which tissue repair has taken place, the results of gas inhalation could produce or induce disease. Experience seems to be showing us that we were somewhat hysterical in our first prognosis in regard to injury of this kind; that cases which are not immediately fatal make quite complete and satisfactory recoveries with no chance for sequelae. There are two outstanding reasons for this rush of claims based on this cause.

One is that it has come to be a fixed belief in the mind of the layman that gas can and does produce tuberculosis. There is no doubt that the majority of those who seek relief on this ground are sincere in their belief, but it is a matter of no less doubt that they are mistaken in this belief—to the detriment of the taxpayer who, like Jones, must "pay the freight." From the medical side, there is the fact that many diagnoses of tuberculosis are based on X-ray findings. It is true that, in a lung which has been subjected to irritant gas, there will be a varying amount of tissue irritation, even destruction in the graver cases. The repair of this damaged area will of course give birth to certain sclerotic areas which in the skiagram may give a picture analogous to that of pulmonary tuberculosis and still be no more related to it than was Middleton to Moses, and he claimed his descent because he could drop the *iddleton* and add the *oses*.

We are quite apt, all of us, professional and layman alike, to ride a new idea to death, abandoning it only when it *is* definitely proved to be defunct.

In the text of this issue (*Military Surgeon*-Ed.) will be found an extract of a very thorough and exhaustive report made by Lieut. Colonel H. L. Gilchrist, M. C., U. S. A. who was connected with the Gas Service during the war, saw a great deal of this class of casualty in France and is now attached to the Chemical Warfare Service. His views are worth very serious consideration, as are the opinion of others whom he quotes. If it is true, as it certainly seems to be, that tuberculosis is neither caused nor activated by having been gassed some three or four years ago, you and I and the rest of the taxpaying martyrs are going to have our load materially increased by the granting of a large number of disability claims based on this ground.

JAMES ROBB CHURCH.

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Memorial to American Dead

Too much cannot be said for the latest project of the American Women's Legion, to erect by popular subscription a monument to the American dead in France.

Some of us are prone to forget that there are thousands and thousands of parents living in remote corners of this country who are too ignorant to know that nearly every large community has erected memorials to the men who made the supreme sacrifice, and too poor to undertake such an enterprise themselves even though they are prompted and inspired to give reverence just as devoutly as the well to do parent.

For this reason the plan of the Legion is a beautiful one because it permits everyone to contribute. Even the smallest contributor has the feeling of actual participation in erecting a lasting tribute to the departed ones, which offers a solace that otherwise could never be realized.

COAST ARTILLERY BOARD NOTES

Work of Board for Month of June, 1922

DURING the month of June the board received or undertook the following new projects.

C. A. B. No. 39. Thompson Spotting Chart.
C. A. B. No. 40. Elevation tables Fort Williams.
C. A. B. No. 41. Range Charts Fort Williams.
C. A. B. No. 42. Range tables Fort Williams.
C. A. B. No. 43. Range Board model 1921.
C. A. B. No. 44. Make-your-own-dry-cells.
C. A. B. No. 45. Range Finding System in connection with Bull Tucker apparatus. (Blackwell)
C. A. B. No. 46. Fire Control charts.
C. A. B. No. 47. Test of self contained range finders, for A. A. work.

Of these projects only the last was active during the month. The instruments have been received, installed, and personnel is being trained for test. This test is being run in conjunction with test of 30-ft. self contained base instrument and Navy Light Filters by Major F. H. Smith who was assigned to duty with the Board during the month.

The test of the modified Galitska panel was run during the month and the final report has been completed. Tests indicate that white on black gave the best results but that at high altitudes (10,000 ft.) a larger panel would be necessary.

The usual charts, range and elevation tables were furnished during the month.

The main efforts of the board were devoted to the completion of training regulations. All these regulations except,

Gunnery
Minimum Specifications for Coast Artillery troops
Gun Drill
Meteorology for Coast Artillery

were completed and submitted for approval and are now being co-ordinated for final submission to Chief of Coast Artillery.

Of the four above mentioned meteorology is 90% complete and will probably be submitted about July 15.

Gun drill is waiting for recommendations of Coast Defense Commanders while minimum specifications has been suspended indefinitely.

No progress has been made on Gunnery as yet and it probably will not be ready for several months.

Employment of Heavy Artillery—Problem No. 1—A Solution

1st Requirement: See next page.

2nd Requirement:

1st Bn 701st Art
CAMP EUSTIS VA
23 March 22 10:00 AM

Field Orders)
No. 1.)

Maps: Special, Camp Eustis Va; Gettysburg 3″ or 1″.

1. Our 1st and 2nd Armies are in contact with the enemy southeast of GETTYSBURG.
2. This battalion moves by rail to LITTLESTOWN, Pennsylvania today. Cars will be spotted at 1:00 PM. The Bn will be entrained by 7:00 PM.
3. (a) Btry A with 1st Plat Bn C Tn attached will entrain on Siding No. 1.
   (b) Btry B with 2nd Plat Bn C Tn attached will entrain on Siding No. 2.
   (c) Bn Hq and Hq Det, c Tn (less 2 Plats) with attached sec of Serv Btry and medical troops will entrain at Siding No. 3.
   (x) Two men will be placed in charge of each flat or gondola car.
   All organizations will draw dunnage at Camp Utilities at 11:00 AM 23 March. Portable end ramps and floor plates will be drawn by batteries and Headquarters.
   A guard will be placed at door of each box car occupied by troops.
   Equipment for detraining will be loaded so that it will be readily accessible on arrival.
4. All baggage will, except that carried on the person, be left on trucks. All gasoline and water tanks will be filled to capacity before entraining.
   In addition to rations prescribed by F.S.R. organizations will carry two days cooked rations.
5. Bn CP last box car on train after 1:00 PM this date.

A
Major.

Copies to:
CO BTRY A
CO BTRY B
CO Bn C Tn
CO Sec Serv Btry
Bn Surg
CO 701st Art
CO Camp Eustis Va
Staff
File
War Diary

1st Requirement

Battery "A" and 1 Plat Bn C Tn			Battery "B" and 1 Plat Bn C Tn			Sect. Serv. Bty. Bn Hq and Hq Det Bn Comb Tn (Less 2 plats)		
Car No.	Kind	Contents	Car No.	Kind	Contents	Car No.	Kind	Contents
1	Flat	1 Gun and Limber, 1 Tractor and platform	32	Flat	1 Gun and limber; 1 Tractor and Platform	63	Flat	2 Trucks, F.W.D.
2	"	"	33		"	64	"	"
3	"	"	34	"	"	65	"	"
4	"	"	35	"	"	66	"	"
5	"	1 tractor, 10-ton; 1 truck, tank; 2 motorcycles	36	"	1 tractor, 10-ton; 1 truck, tank; 2 motorcycles	67	"	"
6	"	1 5-ton tractor; 1 trailer, kitchen; 1 trailer, water	37	"	1 5-ton tractor; 1 trailer, kitchen; 1 trailer, water	68	"	"
7	"	1 5-ton tractor; 1 trailer, M.G.; 3 motorcycles	38	"	1 5-ton tractor; 1 trailer, M.G.; 3 motorcyles	69	"	1 trailer, radio; 1 truck, ¾-ton
8	"	1 car, motor; 1 truck, ¾-ton; 2 motorcycles	39	"	2 motorcycles; 1 car, motor; 1 truck, ¾-ton	70	"	1 trailer, kitchen; 1 trailer, water; 1 tractor, 5-ton.
9	"	2 trucks, F.W.D. (rations and baggage)	40	"	2 trucks, F.W.D.; (rations and baggage)	71	"	Same as 70
10	"	"	41	"	"	72	"	1 ambulance; 1 car, reconnaissance
11	"	"	42	"	"	73	"	2 cars, motor (5 pass.); 3 motor cycles
12	"	"	43	"	"	74	"	1 truck, ¾-ton; 1 truck, light repair; 2 motorcycles
13	"	2 trucks, F.W.D.; Arty. Supply	44	"	2 trucks, F.W.D., A.S.	75	"	6 motorcycles, S.C.; 1 car, motor

14	"	1 truck, F.W.D., A.S.; 1 truck, light repair	45	"	1 truck, F.W.D., A.S.; 1 truck light repair	76	Box	25 men
15	"	2 trucks, F.W.D.	46	"	2 trucks, F.W.D.	77	"	25 men
16	"	"	47	"	"	78	"	25 men
17	"	"	48	"	"	79	"	Remainder of men
18	"	"	49	"	"	80	"	Officers
19	"	"	50	"	"	81	Caboose	Train crew
20	"	"	51	"	"			
21	"	"	52	"	"			
22	"	"	53	"	"			
23	"	"	54	"	"			
24	Box	25 men	55	Box	25 men			
25	"	"	56	"	"			
26	"	"	57	"	"			
27	"	"	58	"	"			
28	"	"	59	"	"			
29	"	"	60	"	"			
30	"	Remainder of men	61	"	Remainder of men			
31	"	Officers	62	"	Officers			

NOTE: 2 men ride on each flat or gondola car.

3rd Requirement:

See solution of 1st requirement for train composition.

On arriving at destination the train is broken into 3 sections, breaks taking place between batteries and Bn Hqrs Section. The leading car of Battery A will be spotted just south of RJ 700 yds. N.E. of RJ 566, and leading car of Battery B just south of RJ 566; the leading car of Hq Section just south of private road leading from house just east of A. J. Bair.

The work proceeds as follows: Each driver in charge of a vehicle with his helper proceed to their places and remove the dunnage, place the floor plates in position and get ready to take their vehicle off the train when the time comes. Working details assemble and secure the end loading ramps at head of each section. The leading vehicle is then taken off and proceeds to clear the road enough to allow succeeding vehicles to take their proper places in column as they come off the train. The battalion commander would expedite the detraining so far as practicable and take steps to avoid confusion of columns on the road.

Estimates of time required:

Time to spot train and get ready for unloading.....1 hour.
Average time to unload one car.....10 minutes.
Time to unload battery (23 flat cars).....230 minutes.
Accident allowance.....40 minutes.
Total time to unload battery.....4½ hours.
Elapsed time from arrival at Littlestown to completion of unloading.....5½ hours.

4th Requirement

(A) *Organization of Light Column (by section).*

Section No.	*Units*	*Vehicles*	*Road Space (yds).*
1	Bn. Hq.	2 Motor Cars, passenger	54
		8 Motorcycles	160
		1 Car, reconnaissance	27
		1 Truck, cargo, ¾ T.	27
		1 Truck, F.W.D., with radio trailer	32
		Total	300
2	Btry A (1st Sect)	1 Motor Car, passenger	27
		2 Motorcycles	40
		1 Truck, cargo, ¾ T.	27
		4 Trucks, F.W.D.	108
		Total	202
3	Btry A (2d Sect)	3 Trucks, Art. Supply	81
		1 Truck, light repair	27
		1 Truck, tank	20
		3 Trucks, F.W.D.	81
		Total	216
4 & 5	Btry B	Same as Btry A above (in two sections)	
6	Bn C Tn (1st Sect)	1 Motor car, passenger	27
		9 Trucks, F.W.D.	243
		Total	270

Section No.		*Vehicles*	*Road Space*
7	Bn C Tn (2nd Sect)	1 Motorcycle	20
		9 Trucks, F.W.D.	243
		Total	263
8	Bn C Tn (3d Sect)	Same as 2nd Section	
9	Bn C Tn	Same as 2nd Section, adding 1 water trailer and omitting one motorcycle	248
10	Tns of Bn Hq	1 Truck, F.W.D., with water trailer	32
		1 Truck, F.W.D., with Kitchen trailer	32
		1 Motorcycle (Med.)	20
		1 Motor ambulance	27
		1 Truck, cargo, ¾ T.	27
		1 Truck, F.W.D. (F Tn)	27
		Total	165
11	Tns of C Tn	2 Motorcycles	40
		1 Truck, light repair	27
		1 Truck, F.W.D., with kitchen trailer	32
		1 Truck, F.W.D. (F Tn)	27
		Total	126
12	Section of Serv Btry	2 Motorcycles	40
		6 Trucks, F.W.D.	162
		Total	202

N.B. Intervals of 50 yards between sections.

Organization of Heavy Column (by section)

1	Btry A	1 Motorcycle	20
		3 Tractors, 10-ton, with guns, limbers and platforms	150
		Total	170
2	Btry A	1 Tractor, 10-ton, with guns, limbers and platforms	50
		1 Motorcycle	20
		1 Tractor, 2½ or 5 T, with M.G trailer	30
		1 Tractor, 10 T (spare)	25
		1 Truck, F.W.D.	27
		1 Tractor, 2½ or 5 T, with K and W trailers	35
		1 Motorcycle	20
		Total	207
3	Btry B	Same as 1st Section Btry A.	
4	Btry B	Same as 2nd Section, Btry A, adding:	
		2 Tractors, 2½ or 5 T.	50

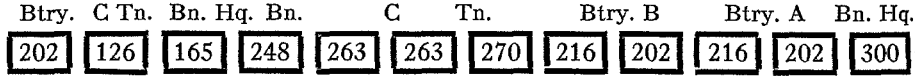
N.B. Intervals of 50 yards between sections.

MAP PROBLEM No. 1

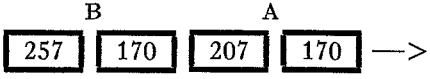
4th Requirement:

(B)

Light Column. Total length including 50 yd. intervals 3223 yards.



Heavy Column. Total length including 50 yd. intervals 954 yards.



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Employment of Heavy Artillery—Problem No. 2

References:

Gettysburg 1-inch Map.

Tables of Organization 755 W
754 W
555 W

Strength of medical and ordnance detachments is estimated from table 753 W (Regiment).

Provisional Service Regulations for Ry. Artillery, pars. 6 to 26, and pars. 102 to 106, printed herewith.

General Situation:

The Blue Ridge Mountains and the Maryland-Pennsylvania line eastward form the boundary line between two hostile states; Reds, west and north, Blues, east and south.

War was declared 15 Feb 1922 and Blues immediately invaded Red territory in vicinity of GETTYSBURG. Since 15 March the 1st and 2nd Blue Armies have been in contact with the enemy along the general line (338.0-738.0)—FAIRPLAY—WILLOW GROVE S H—WHITE RUN—GRANITE HILL—HUNTERSTOWN—NEW CHESTER—(364.0-765.5). Both sides have been improving their lines.

Special Situation (Blue):

The 1st Bn 901st Artillery (12" mortars, railway, CAC troops) is at Camp Eustis, Va. It has attached to it its section of the Service Battery and the following medical troops: 1 officer, 10 enlisted men. The latter troops have with them:

1 motor ambulance,
1 motorcycle, and
1 truck, ¾ T.

The battalion has with it also an Ordnance Detachment of 2 officers and 27 men with following equipment:

1 repair car (R. R.)
1 shop supply car (R. R.)
1 motorcycle
1 truck, F. W. D.

At 8:00 AM 24 March the CO Camp Eustis received telegraphic instructions attaching the 1st Bn 901st Art to the 1st Army and directing it to proceed at once

Table 754 W.—BATTALION, 8-INCH GUNS OR 12-INCH MORTARS, RAILWAY (Consolidated Table).

(War Strength.)

May 14, 1921.

Road Space____ ———Yards

Tonnage _____ ———Tons

1	1 UNITS	2 Specialist Rating (Class)	3 Symbol Number	4 Headquarters and Headquarters Detachment	5 Two Batteries	6 Total	7 Remarks
2	Majors			1		1	
3	Captains			1	2	3	
4	First lieutenants			2	4	6	
5	Second lieutenants			2	4	6	
6	Total Commissioned			6	10	16	
7	First sergeants			1	2	3	
8	Staff sergeants			3		3	
9	Sergeants			5	28	33	
10	Corporals			7	34	41	
11	Privates 1st Class (incl.)			11	80	91	
12	Privates (incl.)			24	170	194	
13	Miscellaneous	4th		(3)	(6)	(9)	
14	Miscellaneous	5th		(5)	(8)	(13)	
15	Miscellaneous	6th		(10)	(12)	(22)	
16	Total Enlisted			51	314	365	
17	**Aggregate**			57	324	381	
	EQUIPMENT COMMON TO BOTH TYPES OF ARMAMENT						
18	Cars, motor, 5 passenger			1		1	
19	Cars, reconnaissance			1		1	
20	Cars, railway						
21	Ammunition				12	12	
22	Electric power plant			1		1	
23	Fire control			1	2	3	
24	Gondola				2	2	
25	Tank				2	2	
26	Store			1	6	7	
27	Motorcycles, with side cars			2	4	6	
28	Trucks, cargo, 3/4 ton			2	4	6	
29	Trucks, cargo, (P.W.D.)			4		4	
30	Trucks, radio, divisional			1		1	
31	Guns or mortars				8	8	
32	Guns machine, anti-aircraft				8	8	
33	Pistols			11	72	83	
34	Rifles, automatic			2	16	18	
35	Rifles			44	236	280	
	ADDITIONAL EQUIPMENT FOR 12-INCH MORTARS						
36	Cars, railway, ammunition				12	12	

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Table 755 W.—BATTERY 8-INCH GUNS OR 12-INCH MORTARS (RAILWAY)

(War Strength.)

May 14, 1921.

Road Space___ ———Yards

Tonnage ____. ———Tons

1	2	3	4	5	6	7
UNITS	Specialist Rating (Class)	Symbol Number	Battery Headquarters	Firing Sections	Total	Remarks
2 Captains			1		1	
3 First lieutenants				2	2	(a) For duties, see Drill Regulations.
4 Second lieutenants				2	2	
5 Total Commissioned			1	4	5	(b) Includes: 40 privates 1st class; 85 privates
6 First sergeants			1		1	
7 Sergeants, incl.			3	9	14	
8 Mess			(1)			
9 Supply			(1)			
10 Miscellaneous			(3)(a)	(9)(a)		
11 Corporals, incl			5	12	17	
12 Clerk, battery			(1)			
13 Miscellaneous			(4)(a)	(12)(a)		
14 Privates, 1st class and privates, incl.			25	100	125(b)	
15 Chauffeurs	5th		(2)			
16 Cooks (Assistant)	5th		(2)			
17 Cooks (First)	4th		(2)			
18 Mechanics, chief	4th		(1)			
19 Mechanics	5th			(4)		
20 Motorcyclists	5th		(2)			
21 Miscellaneous (not rated)			(16)	(96)		
22 Total Enlisted			36	121	157	
23 Aggregate				125	169	
EQUIPMENT COMMON TO BOTH TYPES OF ARMAMENT						
24 Cars, railway						
25 Ammunition				6	6	
26 Fire control				1	1	
27 Gondola				1	1	
28 Tank				1	1	
29 Store			3		3	
30 Motorcycles, with side cars			2		2	
31 Trucks, cargo, 3/4 ton			2		2	
32 Guns or mortars				4	4	
33 Guns, machine, anti-aircraft				4	4	
34 Pistols			8	28	36	
35 Rifles, automatic			4	4	8	
36 Rifles			25	93	118	
ADDITIONAL EQUIPMENT FOR 12-INCH MORTARS						
37 Cars, railway, ammunition				6	6	

Summary of Specialist Ratings:
4th Class ----- 3
5th Class ----- 4
6th Class ----- 6
Total 13

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Table 555 W.—SERVICE BATTERY RAILWAY ARTILLERY REGIMENT.

(War Strength.)

May 10, 1921.

Road Space..... ——— Yards

Tonnage ..... ——— Tons

1	UNITS	2 Specialist Rating (Class)	3 Symbol Number	4 Regimental Section	5 Band Section	6 1st Battalion Section	7 2nd Battalion Section	8 3rd Battalion Section	9 Total	10 Remarks
2	Captains			1(c)					1	
3	First lieutenants					1(d)	1(d)	1(d)	3	(a) Personnel records.
4	Second lieutenants									
5	Total Commissioned			1		1	1	1	4	(b) Includes: 34 privates 1st class; 71 privates
6	Warrant officers				1(e)				1	Summary of Specialist Ratings: 2nd Class ----- 4; 3rd Class ----- 10; 4th Class ----- 10; 5th Class ----- 23; 6th Class ----- 7; Total 54
7	Master sergeants, incl.			3		1	1	1	6	(c) Regimental Supply Officer.
8	Engineers			(1)						(d) Battalion Supply Officer.
9	Master electricians			(1)						(e) Band Leader.
10	Sergeants major			(1)(a)						
11	Supply					(1)	(1)	(1)		
12	First sergeants			1					1	
13	Technical sergeants, incl.			1		1			2	
14	Assistant engineers			(1)		(1)				
15	Staff sergeants, incl.				1	1	2	2	6	
16	Assistant band leader				(1)					
17	Assistant engineers						(1)	(1)		
18	Electricians					(1)	(1)	(1)		
19	Sergeants, incl.			6	3				9	
20	Band				(2)					
21	Bugler				(1)					
22	Clerks			(2)(a)						
23	Mess			(1)						
24	Supply			(1)						
25	Miscellaneous			(2)						
26	Corporals, incl.			4	4	1	1	1	11	
27	Agent			(1)						
28	Band				(4)					
29	Clerks			(1)						
30	Supply			(1)		(1)	(1)	(1)		
31	Transportation			(1)						
32	Privates, 1st class and privates, incl.			29	40	12	12	12	106(b)	
33	Chauffeurs	5th		(1)		(1)	(1)	(1)		
34	Chauffeurs	6th		(2)						
35	Clerks	4th		(1)						
36	Cobblers	5th				(1)	(1)	(1)		
37	Cooks (Assistant)	5th		(1)						
38	Cooks (First)	4th		(2)						
39	Firemen	3rd		(1)		(1)	(1)	(1)		
40	Mechanics, chief	4th		(1)						
41	Mechanics	6th				(1)	(1)	(1)		
42	Motorcyclists	6th		(2)						
43	Musicians	2nd			(4)					
44	Musicians	3rd			(6)					
45	Musicians	4th			(6)					
46	Musicians	5th			(15)					
47	Musicians (not rated)				(9)					
48	Miscellaneous (not rated)			(18)		(8)	(8)	(8)		
49	Total Enlisted			44	48	16	16	16	140	
50	Aggregate			45	49	17	17	17	145	
51	Locomotives			1		1	1	1	1	
52	Motorcycles, with side cars			2					2	
53	Trucks, cargo, 3/4 ton			2					2	
54	Trucks, cargo, (F.W.D.)			1		1	1	1	4	
55	Pistols			11	49	3	2	2	67	
56	Rifles, automatic			2		2	2	2	8	
57	Rifles			32		12	13	13	70	

by rail to New Oxford via the Chesapeake and Ohio, Richmond, Fredericksburg and Potomac, Pennsylvania, and Western Maryland railroads and there await orders.

The Camp Commander informs Maj A, CO 1st Bn and directs him to arrange with the Camp Eustis Railway Transportation Officer (RTO) for the necessary transportation.

As Battalion Railroad Officer you are to make all the necessary arrangements with the RTO. Assume that from data previously acquired on the railroads in question, the characteristics of your armament, and consultation with the railroad officials, you have determined that the battalion can be moved over the prescribed route in two sections (or trains). You are informed that the journey will require from 24 to 48 hours. You find it necessary to get transportation from the railroad for your motor vehicles and personnel.

Only the following standard railway equipment is available for the move besides the two locomotives with operating personnel:

Box cars, flats, and gondolas.

1st Requirement:

(a) What assignment of troops does Maj A make to each section of the train? Show number of motor vehicles and personnel in each section. Calculate number of cars of each kind required of the railroad, using the following basis:

For personnel—Use box cars with load not to exceed 25 men per car.

For motor vehicles (except motorcycles)—Use flat cars at rate of 2 vehicles per car.

Motorcycles:—May be carried either in box-cars or gondolas at rate of not to exceed 9 per car.

(b) What information, in addition to the above is furnished the R.T.O. when request is made for transportation?

(c) What train inspections does Maj A make or cause to be made and for what purpose?

2nd Requirement:

(a) Assume transportation is furnished as requested and that it arrives at the camp at 12:00 noon 25 March. Show composition of each section in full and arrangement of cars.

(b) What further information, if any, would Maj A furnish the railroad officials before the train leaves?

3rd Requirement:

Maj A's written order for the move.

Extracts from Provisional Service Regulations for Railway Artillery

MOVEMENT OF RAILWAY ARTILLERY

Orders for Movement

6. An order directing the movement of an element or elements of Railway Artillery should prescribe the following:

1. The personnel.
2. The matériel.
3. The destination.

4. The time of departure.
5. The route.
6. The mission at the destination.

7. In time of war the order should also contain such information of the enemy as is available and which would bear any relation to the movement or to the mission.

Railroad Officer

8. Every battery and larger unit of railway artillery should have an officer detailed as Railroad Officer. The duties of this Railroad Officer are concerned with everything that affects the movement of his unit by rail. His duties also include the building of access, firing and garage tracks. The Railroad Officer of a regiment or higher unit when detailed, should, at once, make a detailed study of all adjacent railroads, both military and commercial, with special reference to the bridges, curves, grades, telegraph stations, water towers, coaling points, yards, wyes, repair shops and round houses. Train inspectors should be organized in each unit and trained under the direction of the Railroad Officer of that unit. These men should be competent to inspect and remedy minor defects in journal boxes, couplings, Westinghouse brake connections, brake shoes, king pins, etc., of the train.

9. In making a movement the Railroad Officer of the highest commander of the units concerned shall make the necessary arrangements with the Railroad Officials.

10. Arrangements must be made with Railroad Authorities for an inspector of the train, at least 24 hours ahead of scheduled departure in order to allow for necessary repairs. Loading can be continued during and after the train inspection except equipment that has to be secured on flat and gondola cars.

11. The arrangements for the movement of a train must be written and copies of them will be furnished the Railroad Officials and to the train commander. The latter will be in charge of the movement after it starts. The Train Commander will designate one of the Railroad Officers as his assistant to carry out the details of the movements of his train and such other functions as pertain to Railroad officers.

12. Special attention must be paid in loading explosives and inflammables that safety regulations prescribed by Interstate Commerce Commission are complied with.

13. Railroad Officers should be conversant with all regulations regarding inspections of trains as made by commercial Railroad Inspectors.

14. The Railroad Officer will be responsible that proper train inspections are made at terminal stations and arrangements made for obtaining water and other necessary supplies for Personnel Cars.

15. Railroad Officers must be ready to furnish train inspectors with information as to (1) Height and widths of tops and loads of cars; (2) distance of corners of top levels from axes of cars. This information is particularly important in determining clearances for tunnels and bridges.

16. There should be available for the use of the commercial railroad authorities, a clearance diagram of the guns, their weights, the car number, weight and contents of each car in the train, the number of cars and the number of passengers.

Composition of Trains

17. The make up or composition of the train or trains cannot be prescribed as it would vary greatly, depending on the material, the route, and the mission at the destination. The Railroad Officer is responsible for the making up of a train or trains and should endeavor to arrange the matériel so that personnel directly

in charge of matériel will ride with it at all times and so that upon arrival at the destination, the mission can be executed without loss of time.

18. When making up trains, in which there are heavy guns they should be placed immediately after the engine with at least one car between guns. This is especially important if the train is long. The heavy weights should come on bridges before the bridge gets a swing. The Railroad officer should know, the tractive power of the locomotives available, the maximum grades and curves on the line, the minimum clearance of the line, whether or not there are any bridges or trestles on the line that are not safe for his trains and the weight of the cars and trains. Particular care must be paid to loads on flat cars and to cars other than standard such as guns, improvised government cars, etc.

Movement over Commercial Railways

19. For general instructions for travel on commercial and military railways see Field Service Regulations (1914) Article VI.

Transportation by Rail. When railway artillery is moved by commercial railway, normally the railway company will furnish the train crew, i. e., conductor, brakemen, etc. In case an Army locomotive is used, a pilot will be furnished in place of the engineer and fireman. The fact that the commercial railway furnishes these men, in no way relieves the train commander from the responsibility that his train arrives at its destination in good condition and at the proper time.

Movements over Military Railways

20. The movements of railway artillery over military railways (those not under the jurisdiction of railway artillery) will be similar to the movements over commercial railways. It will generally be the case, however, that no train crew will be furnished except the engine crew, and only a pilot will be furnished when the railway artillery furnishes its own tractive power. The same information should be available for the authorities of the military railway as is specified above (Paragraphs 15 and 16) for the commercial railway officials.

The lines controlled by the railway artillery are generally short lines leading from storage tracks to firing positions and in some cases longer lines leading to ammunition centers and repair shops. Movements over these lines are effected by the railway officer of the Railway Artillery concerned in the movement. If this movement can be made without interference with other units of railway artillery, the movement is accomplished without reference to higher authority. Such a movement would be the movement of guns or ammunition cars from the storage tracks to the firing position or the movement of empty cars from the firing position to the storage tracks. Any movement over lines which are used by other units of railway artillery will be effected only after applying to the next higher commander for permission to make the movement. The railroad officer of the next higher commander will then arrange the time for the movement and will notify the units concerned.

Loading

21. This should be done under the direct supervision of an officer, detailed for this purpose. A detailed plan should be made in advance so that the loading will proceed without confusion and without loss of time. Details should be made from the command so that the cars may be loaded, if practicable simultaneously. Suitable ramps should be available for loading motor transportation on flat cars. These ramps should be carried on flat cars during a movement. Several sheets of iron, one quarter inch thick, about three feet wide and six feet long should be available to place between adjacent cars. With these sheets of iron in place and the brake wheel removed, motor transportation can be moved from car to car. There should be available a sufficient number of U shaped pieces of iron, the ends

threaded and fitted to bolts, of sufficient length so that when placed over the axle of the motor car concerned, the two ends will project through holes bored in the floor of the car. Lumber for skids should be available for preventing the movement of the cars laterally and longitudinally.

Unloading

22. The unloading should be done under the direct supervision of the officer detailed to supervise the loading. A detailed plan should be made in advance, as for the loading. Details should be made from the command so that as far as possible all the work can be carried on simultaneously. The detraining of the personnel should proceed as outlined in Field Service Regulations.

Making up of the Trains

23. The train, or trains, are made up under the supervision of the railroad officer. The makeup of the train or trains, should follow a well conceived plan based on the conditions outlined above under "Composition of Trains," (Pars. 17 and 18.) Before making his plan for the composition of his trains, the railroad officer should consult with the railroad authorities of the line over which the train is to travel so as to assure its safe and expeditious movement. Cars of questionable clearances should be placed to permit expeditious movement in case of necessary shifting.

The Train in Movement

24. The senior officer of the train is the Train Commander. He is responsible that order is maintained, that the messing of the men is satisfactory and that the mess kits and kitchen utensils and cars are kept clean. He is also responsible for the safe transportation of the armament with the train. Details should be made, if such details have not already been made, by the train commander, as follows:

A Railroad Officer.

A Mess Officer.

An Officer of the Guard.

One Noncommissioned officer in charge of each car occupied by troops.

Such Noncommissioned Officers and privates for guard duty as are considered necessary by the train commander.

One Noncommissioned Officer as Conductor.

Such Noncommissioned Officers and privates for duty as brakemen, flagmen, and trainmen as are considered necessary by the train commander.

When railroad armament forms a part of the train, the maximum speed should not exceed twenty-five miles per hour.

It is advisable to assign each Gun Commander with an assistant to ride on his gun car, or his ammunition car adjoining, to inspect the gun and material on gun-car while in transit.

The Train During Stops

25. At each stop, the railroad officer, assisted by the conductor, brakeman and flagman, make a careful inspection of the train, paying particular attention to the journals and brake shoes of the train, especially the gun cars, in order to prevent hot boxes. An inspection of each gun car is also made to insure that all parts are secure in the travelling position. If the stop allows sufficient time it is desirable to give troops an opportunity for exercise.

The troops should leave the cars in a body under their officers. The train commander should cause "Assembly" to be sounded five minutes before the departure of the train whenever the troops have been allowed or required to leave the train. At stops in railroad stations and cities, the commander of the train should not

allow the men to litter up the ground about the train by throwing papers, fruit skins, etc., upon the ground or station platform.

Safety Precautions

26. Heads and shoulders should be kept inside the cars when the train is in motion. No one should be allowed to ride on the platforms of passenger cars or on any part of other cars unless their duty requires it. Going between moving cars to couple or uncouple same or for any other purpose is prohibited. Jumping on or off cars or engines when moving at high speed is prohibited. Crawling under cars or passing between them while the engine is coupled to the train is prohibited unless the engineer is notified and all precautions taken. When entraining or detraining in the vicinity of the enemy, Machine Guns should be set up and manned at all times. The guns can be set up on flat cars or on the gun platforms. When moving along near the enemy, Machine Guns should be placed on the cars and manned at all times.

DATA ON ROLLING STOCK

102. The rolling stock that a commander of a Railway Artillery Unit might have in his command will probably comprise almost all types of commercial rolling stock and in addition Railway Rolling Stock consisting of Gun Mounts, Ammunition, Fire Control, Tool Cars, and Searchlight Units.

103. The data that the Railway Artillery Commander should have available concerning his rolling stock should be that which is necessary to determine his ability to transport his equipment over any given route to a given destination and such data as is necessary so that he can order replacements of broken material. Each commander of a unit should compile his data for rolling stock in his unit and have it available.

The following data should be on hand:

Locomotives:—Tractive Power.
Water Capacity.
Coal Capacity.
Weight (a) Total
Weight (b) on drivers
Manufacturer.
Type.
Limiting degrees of curvature.
Clearance.

Commercial Cars, Ammunition Cars, Fire Control Cars, Tool Cars, Searchlight and Repair Cars — Weight, Dimensions, Size of Journals, Size of Brake Shoes, Draft Gear, Clearance,

Gun cars:—Data as given in Data Sheets for Railway Artillery, Operations Section C. A. T. C., October 1919.

104. The data for the locomotive if not on hand can be obtained from the manufacturer. Data for cars can be obtained by inspection. The majority of commercial cars will have the data stenciled on them.

105. The following books will be found of value in compiling necessary data for the Unit:

Locomotive Boilers and Engines—Ludy
Forneys Catechism of the Locomotive—Fowler
Locomotive Engine Running and Management—Sinclair

Locomotive Operation—Wood
Air Brake Catechism—Blackwell
Operation of Trains—Prior
Bulletins, American Railway Engineering Association.

DATA ON TRACK

106. Practically all data necessary on Railway construction for the Railroad Artillery Commander can be found in Military Railways, Professional Papers, No. 32 Corps of Engineers, U. S. Army, Revised edition 1917. The following books are suggested to supplement this paper and will be found useful.

Bulletins, American Railway Engineering Association.
Railroad Construction—Webb
Railroad Curves and Earthwork—Allen
Field and Office Tables—Allen

Until other regulations are prescribed the rules and regulations given in Military Railways, Professional Papers, No. 32 Corps of Engineers, U. S. Army, Revised Edition 1917 will be standard.

COULD THESE PROBLEMS

BE IMPROVED?

IF SO—HOW?

THE BULLETIN BOARD

The Army Relief Society

The Army Relief Society, founded in March, 1900, for the purpose of providing relief for the widows and orphans of the officers and enlisted men of the Regular Army, has in the past 22 years accomplished, through small donations, much good to many worthy widows and orphans of the officers and enlisted men of the Regular Army. Their work is done in such a quiet and unostentatious way that very few citizens and very few members of the Army itself have knowledge of what the Society is doing.

The President of the Society is Mrs. Henry L. Stimson, wife of a former Secretary of War, and its list of officials includes many men and women prominent in Army and civilian life.

The following letter addressed to Major General C. J. Bailey contains much information that will be of interest to those who have at heart the welfare of the Army:

"120 East 36th St., N. Y.
June 9th, 1922.

"My dear General Bailey:

I beg to acknowledge with many thanks the receipt of your kind note of June 2nd, enclosing three checks totalling $2,357.25, the net proceeds of the championship boxing contests of the Third Corps Area for the year 1922. This splendid gift to the Army Relief Society is most welcome and is highly appreciated.

The demands upon our funds are greater than ever before. Our Budget for the coming year calls for a disbursement of $48,000. We are starting the year with a balance in the bank of $32,041.57. To this may be added about $11,000, the income receivable during the year from our investments. That will bring our total to $43,041.57, leaving about $5,000.00 yet to be raised if we are not to curtail our work. You will therefore readily see what a help this fine contribution from the Third Corps Area will be in meeting this deficiency. Last year the Army Relief Society disbursed $47,552.73. All but $858.85 of this sum was spent in actual aid. The $858.85 covered the expense of printing and distributing three thousand annual reports, so that you see practically all the money contributed goes to help the widows and orphans of the Regular Army, as we have no office or overhead expenses. Our list of beneficiaries at present comprises an equal number of the families of officers and enlisted men, and we have met every demand for aid. At the time of the terrible accident at Langley Field in the aviation a request by telegraph to the Society from the Commanding Officer for $2,000.00 to be used in behalf of the widows of the men who were killed was made available for their use within twenty-four hours.

I find often so little is known in the Army of the details of our work that I have taken the liberty of telling you about it, at the risk of repeating what you may know already. But we do appreciate and value so much the co-operation

of the Army in our work, not only by contributing to our funds but by giving us the opportunity to help in emergencies, that I hope you will express to all those who were instrumental in raising the money you have so kindly given, the hearty thanks of all the Officers and Board of Managers of the Army Relief Society.

Believe me, my dear General,

Very gratefully yours,

MABEL W. STIMSON (Mrs. Henry L.),
President of the
Army Relief Society."

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California Reserve Officers Assigned to Presidio Posts

(From the *San Francisco Chronicle*)

Sixty reserve officers in California belonging to the coast artillery reserve corps have been assigned or attached to units of the coast artillery, it was announced at local army headquarters yesterday. The officers have been directed to report by letter to the executive officer, coast artillery section, organized reserves, at the Presidio of San Francisco, for instructions. The assignments follow:

To the 873d Company, Coast Artillery—Captain Thomas P. Ahern, San Francisco, assigned; First Lieutenant Charles J. Bandmann, San Francisco, assigned.

To the 874th Company, Coast Artillery—Captain Bradley B. Brown, San Francisco, assigned; Second Lieutenant William T. Nilon, San Francisco, assigned.

To the 875th Company, Coast Artillery—Captain RussellRyan, San Francisco, assigned; Second Lieutenant Harrison L. Coles, San Francisco, assigned.

To the 876th Company, Coast Artillery—Captain James A. Taylor, San Francisco, assigned; Second Lieutenant Edwin H. Toepke, San Francisco, assigned.

To the 877th Company, Coast Artillery—Captain AlexS. Allen, San Francisco, assigned; First Lieutenant James F. Dunworth, San Francisco, assigned.

To the 878th Company, Coast Artillery—Captain James V. Clancy, San Francisco, assigned; First Lieutenant Frank Mikels, San Francisco, assigned.

To the 879th Company, Coast Artillery—First Lieutenant Archibald M. McKillop, San Francisco, assigned; Second Lieutenant Leonard B. Daniels, San Francisco, assigned.

To the 880th Company, Coast Artillery—Captain Albert T. Emerson, San Francisco, assigned; First Lieutenant Charles E. Rhein, San Francisco, assigned; Second Lieutenant Percy H. Giannini, Berkeley, assigned.

To the 881st Company, Coast Artillery—Captain Sene Mott, San Francisco, assigned; First Leiutenant Stanley L. Dod, San Francisco, assigned.

To the 882d Company, Coast Artillery—Captain James B. Oliver, San Francisco, assigned; Second Lieutenant Ernest J. Gorman, San Francisco, assigned.

To the 883d Company, Coast Artillery—Captain Robert D. Spandau, San Francisco, assigned; Second Lieutenant Dwight E. Lyon, San Francisco, assigned.

To the 884th Company, Coast Artillery—Captain Alexander R. Jones, San Francisco, assigned; Second Lieutenant Capen A. Fleming, San Francisco, assigned.

To the 885th Company, Coast Artillery—Captain Edward L. Macaulay, San Francisco, assigned; Second Lieutenant John E. Paschal, San Francisco, assigned.

To the 886th Company, Coast Artillery—Captain Albert E. Schoenfeld, San Francisco, assigned; Second Lieutenant Philip S. Mathews, San Francisco, assigned.

To the 887th Company, Coast Artillery—First Lieutenant George W. Hall, Corte Madera, assigned.

To the 888th Company, Coast Artillery—Second Lieutenant Philip F. Brown, San Raphael, assigned; Second Lieutenant James L. Guthrie, Ross, assigned.

To the 890th Company, Coast Artillery—Captain Henry W. McClure, San Mateo, assigned; Second Lieutenant William D. Soule, San Mateo, assigned; Second Lieutenant Glenn H. Stern, Burlingame, attached.

To the 891st Company, Coast Artillery—Captain Albert B. Cox, Palo Alto, assigned; Second Lieutenant Henry A. Alderton, Jr., Palo Alto, assigned; Second Lieutenant Dwight B. Gladstone, Palo Alto, attached; Second Lieutenant Thomas J. Hamlyn, Palo Alto, attached; Second Lieutenant Arthur G. James, Palo Alto, attached.

To the 895th Company, Coast Artillery—Captain Francis G. Kellogg, Eureka, assigned.

To the 896th Company, Coast Artillery—First Lieutenant Robert W. Solomon, Eureka, assigned.

To the 897th Company, Coast Artillery—Captain Eugene B. Butler, Oakland. assigned; First Lieutenant Albert Picard, San Francisco, assigned; Second Lieutenant Arthur J. Swank, San Francisco, assigned.

To the 898th Company, Coast Artillery—Captain James Collins, Oakland, assigned; Second Lieutenant Edward O. Blodgett, Oakland, assigned.

To the 899th Company, Coast Artillery—First Lieutenant Glenn R. Castle, Oakland, assigned; Second Lieutenant Herbert H. DuBois, Oakland, assigned.

To the 900th Company, Coast Artillery—Second Lieutenant Paul D. Augsburg, Oakland, assigned; Second Lieutenant Milton R. Davis, Oakland, attached; Second Lieutenant Manning M. McIntire, Oakland, attached.

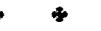
To the 901st Company, Coast Artillery—Captain Russell K. Havighorst, Stockton, assigned;

To the 902d Company, Coast Artillery—Captain Alva R. Davis, Berkeley, assigned; Second Lieutenant Leo V. Steck, Berkeley, assigned.

To the 903d Company, Coast Artillery—Captain Claude R. Corbusier, Berkeley, assigned; First Lieutenant Stafford L. Jory, Berkeley, assigned; Second Lieutenant Clarence S. Cramer, Berkeley, assigned.

To the 904th Company, Coast Artillery—Second Lieutenant Harry Abernethy, Berkeley, assigned; Second Lieutenant Howard C. Newberry, Berkeley, attached.

To the 905th Company, Coast Artillery—Captain Claire A. Duffie, Berkeley, assigned; Second Lieutenant Frank A. Morgan, Jr., Berkeley, assigned.



Memorial Cross

The JOURNAL has been asked to acquaint its readers with a project of the American Women's Legion which we feel is worthy of the consideration of everyone.

The project as stated by the Legion is as follows:

MEMORIAL CROSS
TO
OUR DEAD WHO REMAIN IN FRANCE
TO BE ERECTED IN
ARLINGTON NATIONAL CEMETERY
BY THE
ARGONNE UNIT
OF THE
AMERICAN WOMEN'S LEGION

The War Department has designated the site and the Commission of Fine Arts has approved the sample design of a white marble cross, which is to stand in Arlington National Cemetery among the graves of those who fell in the Great War.

It is appropriate that subscriptions should be as wide-spread as possible in order that all who wish to make part of this Memorial their own, may do so, irrespective of the amount contributed.

The Argonne Unit of the American Women's Legion has undertaken the necessary management with the approval of the Secretary of War, and invites subscriptions to the end that the requisite $2500 may be collected in time to erect the monument by Armistice Day of 1922.

Subscriptions will be acknowledged and should be sent by postal money order or check to

Miss N. R. Macomb, Treasurer,
1314 N Street Northwest,
Washington, D. C.

or

Argonne Unit Memorial,
National Savings & Trust Co.
15th and New York Ave.,
Washington, D. C.

Committee

Miss Abbie B. McCammon, Chairman
Mrs. Wm. M. Black
Mrs. Alex. Rodgers
Miss N. R. Macomb

BOOK REVIEWS

Labor and Democracy. By William L. Huggins. The Macmillan Co. New York. 1922. 5" x 7¾". 213 pp. Cloth. Price $1.25.

Here is perhaps one of the most important books for Americans published this year, whose title is misleading, at least to the extent that it is not truly descriptive of the book's scope and purpose. Actually it is an account by William L. Huggins, the author of the Kansas Industrial Act and first presiding judge of the Kansas Court of Industrial Relations, of the inception of the Act, and a descriptive account, both of the Act, and of the functioning of the Court of Industrial Relations.

The book is important—vastly important—because it gives a clear idea of the practical working of a significant experiment. Briefly it is important that all Americans should know that this new Court has jurisdiction only of cases affecting certain fundamental industries, and then only when the circumstances are such that the rights of the general public are likely to be impaired by the conditions of particular controversies between Capital and Labor; furthermore that its decisions and orders command the backing of the entire police power of the state, but only for the temporary period that in any case the rights of the public are concerned.

Making all due allowance for the enthusiasm of a writer who is the author and administrator of this law, it is clear that he has brought into the realm of fact a series of ideas which promise much if further extended throughout the United States. This experiment cannot be ignored. It may not finally be approved either by Labor, Capital, or the Public, but it must be studied and understood.

The book includes appendices which present the complete text of the law and numerous opinions in cases already adjudicated which demonstrate that labor questions are justiciable, tha tthe *social rights* as well as *legal* rights of workers are considered, and that in every controversy the elements of equity on the part of labor, capital and public must be and are determined and respected.

The Little Corner Never Conquered. By John Van Schaick, Jr. The Macmillan Co. New York. 1922. 282 pp. Cloth. Price $2.00.

"The Little Corner Never Conquered" is an account of the relief work of the American Red Cross in Belgium from Sept. 1917 to April 1919. Over four million dollars were given by generous Americans to relieve the Belgians through the American Red Cross alone. The book tells how this huge sum was turned over to various Belgian relief agencies already organized, thus promoting understanding and good will between all classes of Belgians and the United States.

There is very little of the technique and strategy of the War brought out in the book; but much of the human side which is bound up so closely with what is called morale. It brings out that amid the horrors of war a great sense of human brotherhood is deeply felt, binding all classes together.

The "Getting started in Flanders" with Boche planes dropping bombs and the *alerte* going several times a night sounds real to the overseas veteran reader; and when he reads the author's personal diary from September 30 to October 2, 1918, covering the victorious march of the Belgian army back to Brussels, he will decide that the life of a Red Cross man was strenuous and not all humdrum office work.

The great assistance and sterling characters of the King and Queen of the Belgians are brought out forcefully. How the refugee problem was handled deserves study.

The volume appears as one of the Red Cross series which has included Davison's "Story of the American Red Cross;" Bakewells "The Red Cross in Italy," Fife's The Passing Legions," Ames "Red Cross among the French People," and Hungerford's "With the Doughboy in France."

Modern History of Warships. By William Hovgaard. E. and F. N. Spon. London. 1920. 7¼" x 10¼". 502 pp. 209 Ill. 2 Tables. Cloth. Price 42 Shillings.

This historical review of the modern warship begins with the *Demologus*, also called the *Fulton the First*, the first warship propelled by steam, the construction of which was authorized by Congress in 1814, down to the year 1919.

Professor Hovgaard traces the evolution of the modern warship, taking each class of vessel and the principal navies separately, from the first iron ships to those engaged in the Great War. The text is based on lectures prepared for the course in naval construction at the Massachusetts Institute of Technology, so is primarily intended for the use of students of naval construction, naval constructors, naval officers and those particularly interested in naval matters.

The first part of the book deals with the development of the different types of ships of the various navies,—the early armored vessel, the battleship, the cruiser, the torpedo boat, the submarine, particular attention being given to the battleship. The principal points of design of each ship or type are considered, more detailed discussion being given the development during the past twenty-five years. One chapter is devoted to aircraft.

Among the important features of this work is the discussion of lessons learned during the Great War and their possible effect on the design of the future warship. Now that the Washington Conference has fixed the *maximum* displacement of

the capital ship at 35,000 tons and since a battery of eight 16-inch, 45 caliber guns weighs about 7,000 tons, the problem for the naval designer becomes more involved.

The second part of the book is devoted to technical matters—the history of the development of design of the hull, machinery, ordnance, mines, torpedoes and armor.

Notwithstanding the limitations placed on the displacement of the capital ship, the following concluding remarks of the author on the line of progress of the battleship as it appears today are pertinent: "As regards protection against attack by artillery, there appears no immediate necessity for augmenting the thickness of vertical armor, but it is likely that the horizontal armor protection will be further developed in view of the great angles of fall of projectiles at extreme fighting ranges, and the dangers of aerial attack. A more efficient underwater protection is imperative, in order to meet the greatly enhanced submarine dangers."

The Pivot of Civilization. By Margaret Sanger. Brentano's. New York. 1922. 5¼"x 7¾". 284 pp. Limp cloth. Price $2.00.

Steel-cold in its assembly and analysis of the facts accenting the discords in modern life, yet white-hot in its conviction that a new answer must be had for our social riddle, Mrs. Sanger's book is perhaps the most important, because the most challenging, of the year.

Mrs. Sanger contends that all the traditional schools of political and social thinkers, not excepting the Marxians, have erred in conceding preeminence to *hunger* as the fundamental instinct. She contends that at the very basis of civilization lie two instincts, at least equal in force, and frequently opposed in their results—*hunger* and *sex*. It is thus that she arrives at her thesis that the guidance and control of the sex instinct is now the very pivot of civilization, especially so as the real meaning of the power of this instinct has been so long neglected. As the only practicable means of guiding and controlling sex, *birth control* is advocated and this book is devoted to an exposition of the social necessity of birth control both through dissemination of information as the technique of voluntary prevention of conception, and equally through the segregation or sterilization of the mentally deficient, the criminal, and the hopelessly diseased.

Mrs. Sanger is wholly convincing as to the urgent need of birth control, especially as to its greater promise than the program of the eugenists for the improvement of the race. Where she is not so convincing is in her confidence that, possessed of the knowledge of birth control, the countless hordes of the women of the poor, who most need to restrict human production, would have the intelligence and the initiative to apply their knowledge. To whatever extent one agrees or disagrees, this is one of the books that should be read.

Public Opinion. By Walter Lippman. Harcourt, Brace and Co. New York. 1922. 6" x 8¼". 425 pp. Cloth. Price $3.00.

Mr. Lippman's clear thinking and logical mind splendidly illuminates his latest book, Public Opinion. The ordinary or even casual reader will find himself intensely interested in a subject of which he thinks little, and has only general terms by which he may express his thought.

Mr. Lippman follows all the winding trails of thought and action which go to make up the total of human experience and therefrom shows us how Public Opinion is formed. His first chapter "The Pictures In Our Heads," of itself, is a masterpiece, and a fitting introduction to the pages which follow. Then he begins with "Approaches to the World Outside" wherein he discusses Censorship

and Privacy, Contact and Opportunity, and finally we realize as never before, how far-reaching are the forces that make our opinions, and how necessary it is that there should be a reliable picture of the world, that governments, schools, newspapers, and churches might make greater headway against the failings of democracy. And to make this more perfect picture, Mr. Lippman would have organized public opinions. These opinions should be the task of political science, and should be given to the public by the press.

In other words, a self-governing people should organize a machinery of knowledge in order that the newspapers may interpret public life more accurately. After reading Mr. Lippman's book it would be difficult not to follow him to the same or a similar conclusion.

The Rising Temper of the East. By Frazier Hunt. Bobbs-Merrill Co. New York. 1922. 6″ x 8½″. 248 pp. Cloth. Price $2.50.

Mr. Hunt has travelled widely throughout China, India, Siberia, Korea, Japan, Mexico and the Philippines, and his book is the story of the revolt of the common people in all these countries. It is a warning to the white civilization of the world as well. The author says: "New ideals of nationalism have lit up the imagination and hearts of these peoples. They have been stirred from their great coma." He insists that they are not to be placated and that they will carry on, with violence if need be, until they enjoy a real freedom—until their lands are their own and not a place where the white race may enjoy further exploitations.

Mr. Hunt writes with enthusiasm and sympathy for these Eastern people and yet commands confidence in the poise of his judgment.

Socialism and the Average Man. By William Howard Doughty, Jr., Professor in Government, Williams College. G. P. Putnam's Sons. New York. 1922. 5½″ x 8¼″. 238 pp. Cloth. Price $2.50

Professor Doughty has frankly set himself the task of discrediting Socialism, a purpose which is made clear on the title page, and reiterated in the strongest terms through the preface and every succeeding chapter of the book. Because of this very explicit renunciation of impartiality, the reviewer, who has some acquaintance with Socialist viewpoint and doctrine, fully expected to find that in his earnest pursuance of a sincere purpose, Professor Doughty would fail to make out even a fair case for Socialism, understating its aspirations, and overstating its inconsistencies. However, after a most painstaking reading of the book, the reviewer must bear witness that except in one particular, which will subsequently be mentioned, Professor Doughty has stated the facts concerning Socialism with accuracy and substantial fairness. Especially has he fortified himself by establishing every base from which he launches some attack, upon direct, and often lengthy quotation from Socialists of acknowledged standing.

The author begins with an examination of Socialist doctrine to answer the query, "What is Socialism," and wading relentlessly through a maze of theories, he leads us to the conclusion, which seems to him inescapable, that no matter how different schools of Socialists may falter in accepting the outcome of their ideas, yet inevitably if Socialism were to be embodied in the full control of government, not only would Capital be overthrown and expropriated, but the government—which would control all the population—would be controlled by but one element of the population, the proletariat.

Among the many things brought to light in the succeeding chapters of the book, particular and reiterated stress is laid on the fact that in this "government of the people, by a class, for a class," which is the practical aim of Socialism, the change must be made and maintained by force, and furthermore, that in the Socialistic

state the freedom of the individual will is further curtailed by the two facts, first, that in order to share in government, he must accept a mode of employment and standard of life arbitrarily chosen by others in order to qualify him as a member of the proletariat, and second, that even if he does overturn his natural predilections in order to qualify for membership in the ruling class—the Proletariat—he may not be accepted, for unlike our present political parties, the Proletariat is to be a close corporation, admitting or excluding as it chooses.

Throughout the book, the author insists that essential elements in the credo of all socialists are the resort to force and the dominance of all classes by the proletariat. Certainly these doctrines are not so universally subscribed to, at least unless we rule out men like John Spargo from the Socialist fold. He certainly is an exception to Professor Doughty's contention. Mr. Spargo, in his book entitled "Bolshevism," has said—"There is nothing more certain in the whole range of social and political life than the fact that the doctrine that the power of the state must be seized and used by the proletariat against the non-proletarian classes, even for a relatively brief period, can only be carried out by destroying all the democracy thus far achieved."

Relatively a large portion of the work is devoted to Socialist Propaganda, which Professor Doughty classifies as Philosophical, Emotional, and Inflammatory, while the most interesting part of the book is that devoted to the few cases where Socialism has actually had an opportunity to function. Of these the most telling example is that of the little known colony of New Australia, founded in Paraguay in the final decade of the 19th Century, by settlers from Australia. Although established under the most favorable conditions imaginable, this experiment miserably failed, and the account is a striking revelation of the psychoogical misapprehensions which Socialist theory labors under.

Sporting Firearms of Today in Use. By Paul A. Curtis, Jr., Shooting Editor of "Field and Stream". E. P. Dutton and Co. New York. 1922. 5½" x 8". 280 pp. Cloth. Price $3 50.

A glance at the title ordinarily would be sufficient for the typical American sportsman who has many distinct recollections of bewildering experiences with manufacturers' and trade catalogues on guns, rifles and ammunition. The average sportsman who spends about two weeks of the year hunting has neither the ability nor the desire to appreciate just pages and pages of dry technical terms. Naturally he is skeptical when he sees a notice of a new book on firearms for visions of things ballistic loom in front of him. He knows nothing of the ballistics of small arms and honestly believes it isn't necessary, for doesn't he know how to handle his gun?

"Sporting Firearms of Today in Use," despite what might be expected of it, makes surprisingly pleasant reading, for it is written not for the ballistic expert but for the average American sportsman. Notwithstanding the apparent absence of technical information this book serves the purposes not only of the enthusiast who never had but one gun or rifle, but of the collector who is forever looking for an ideal battery.

The author sits down with you and tells you in everyday language the kind of rifle he would choose, the kind of pistol he would choose and the kind of shotgun he would choose. He discusses the different types from personal knowledge and experience; he builds up his idea of the shotgun of the future realizing the wonderful progress made with the rifle and the fact that the shotgun by comparison has been standing still since the birth of the breech loader.

Taschenbuch der kriegsflotten. 20th year. 1922. Edited by B. Weyer, Korvettenkapitan, a D. With 357 photographs, plates, drawings and diagrams, and four colored plates of flags. J. F. Lehmanns, Munich. 1922. 5 x 7 ". Cloth.

The first half of this book, (174 pages) lists war-vessels by country, giving name of ship, date of construction, tonnage, armament (in metric measurement) and voluminous data as to dimensions, turning radius,etc.

The second part gives photographs of each major class, with deck and profile drawings, showing location of armament and armor, and a recapitulation of size of guns and engine power, etc. This is followed by a summary of the gun-power of the different nations, tabulated so as to show the number of each size of major caliber. Then a summary of the German navy losses during the war [in which the the "Unterseeboote" (Submarines) make by far the greatest showing], brief discussions of the naval policies of the great powers, and text of the Washington Conference.

A very complete index of ship-names completes the volume, which will be found a very complete reference work for naval students.

Universe. By Scudder Klyce. Published by the Author. Winchester, Mass. 9½" x 12½" . 260 pp. Price $3.00.

The "Universe is perhaps the most astounding book the average man could find. To say the author's claim is daring is to put it mildly. He says his book solves all problems of why, how, what, in science, religion, and philosophy. Or it gives an intelligible and unified statement of the fundamentals of all things, and applies that to everyday life." The author who is a retired officer of the United States Navy claims that he started to write the book while a student at the Post-graduate School of Engineering at Annapolis in 1910, as a treatise on handling men; that what he is really trying to do is to show the reader how to handle himself.

What greater recommendation for an Army officer can a book have! Does the JOURNAL recommend this book as a treatise on how to handle oneself? The JOURNAL honestly believes that in order to fully appreciate this book one must have learned how to handle oneself. How else may one know whether the author has found a verifiable solution of the why, how and what of science, religion and philosophy? In other words, it is not a simple text book for the junior officer. He will find it slow hard reading, but that should not deter one who is willing to lay aside his best seller and give audience to a work that is daring in conception, discouragingly hard reading and yet delightfully illuminating.

It is interesting to note that the author was unable to make suitable arrangements with a publisher, so he bought some type, borrowed some books on printing and set up and printed the book himself. It took him one week to print the first page but toward the end he managed to print eight pages a week.

The Way to Will-Power. By Henry Hazlett. E. P. Dutton and Co. New York. 1922. 5¼" x 7¾". 159 pp. Cloth. Price $2.50.

Here is a straightforward exposition of the common sense application of the knowledge of the psychologists and psychoanalysts to the personal problem of developing will-power and force of character. It is written in an untrammelled, one might almost say a breezy style, and perhaps just because of this it may prove the more helpful and convincing. The part of *desire, habit* and *courage* in the process are set forth, as well as the importance of *aim, concentration* and a *program.* This should be a valuable guide to those who, like army officers, are charged with the care of young men, and the influencing of their self-development.

A Handbook of Ethical Theory. By George Stuart Fullerton. Henry Holt and Co. New York. 1922. 5" x 7-3/8". 380 pp. Cloth. Price $2.00.

The author was formerly Professor of Philosophy in Columbia University, and from his own experience and convictions has attempted to compile into a compact text book a symposium of all the best thought of the ages in the field of moral philosophy. Although the study of Professor Fullerton's work is occasionally hampered by his addiction to the use of adjectives and adverbs, unquestionably he has succeeded in presenting a logical development of the elements of ethical thought, with a clear statement of the viewpoints of every philosophy, and withal, tying into the social and economic problems confronting us today. In justification of the stricture upon the author's style, the following sentence is quoted at random, (p. 196). "The intuitive judgment of a sensitive moral nature may often be more nearly right than moral judgments based upon the most subtle of reasonings."

Of particular importance are the chapters on *The Social Will*, developing the doctrine of the predominance of *The Rational Social Will* in the control of ethical sanctions and relations, while perhaps the most interesting single chapter is the one developed to a comparison of personalities and viewpoints of Kant, Hagel and Nietzche.

The usefulness of the book as a text is enhanced by the excellent typographical style, and the Notes and Index included at the end.

Life and History. By Lynn Harold Hough. The George H. Doran Co. New York. 1922. 5½"x 8". 224 pp. Paper boards. Price $1.50.

A collection of twelve papers, variously presented originally as addresses, magazine and newspaper articles. United in basic outlook they attempt to present significant aspects of the relation of Life and History, and the usefulness of history to a true concept of the meaning of life and its problems. The author approaches his task imbued with a personal philosophy noticeably religious and optimistic. For its contribution of an evangelical interpretation of history the work is a valuable corallory to the other resources of the historical student.

The Funk and Wagnalls Practical Standard Dictionary. Abridged from the New Standard Dictionary by Frank H. Vizetelly. New York. Funk and Wagnalls Company, 1922. 8" x 10-½". 1309 pp. 2500 ill. Weight 7½ lbs. Price $5.00.

This dictionary fills in between the New Standard (unabridged) and the Desk Standard dictionaries. It is designed "for the Student of the language, whether in college or the home, in public or commercial life."

The arrangement follows the "Standard" practice, bringing all words into one alphabet, instead of placing proper names, geographical names, and obsolete words in special lists or supplements. It has only one supplement, which lists foreign words and phrases in common use.

Pronunciation is given by two separate keys, the Revised Scientific alphabet, and the Text-book Key. Complete explanations of both keys are given on page xvi, and they are summarized at the top of each page. Definitions of words are given in the order of their usage, the most commonly used meaning being given first. Then follows the derivation of the word; its synonyms, with brief phrases indicating their correct uses; and antonyms.

The book is covered with a good grade of red buckram, decorated in gold and black, the paper is good, and the typographical work and line cuts are excellent. It is to be regretted that the signatures were not sewn on tapes, as it would have made the volume far more durable.

This dictionary will be of great value to those who find the "desk" edition too small for their needs, but who do not care to purchase the large and costly "unabridged" edition.